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CLINICAL LECTURES

ON

CERTAIN DISEASES

OF THE

URINARY ORGANS:

AND ON

DROPSIES.

"Multum egerunt, qui ante nos fuerunt, sed non peregerunt; multum adhuc restat operis, multumque restabit, nec ulli nato post mille sæcula præcluditur occasio aliquid adhuc adjiciendi.'
—SENECA.

CLINICAL LECTURES

ON

CERTAIN DISEASES

OF THE

URINARY ORGANS:

AND ON

DROPSIES.

BY

ROBERT BENTLEY TODD, M.D. F.R.S.

PHYSICIAN TO KING'S COLLEGE HOSPITAL.

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PREFACE.

THE favourable reception given to my first series of Clinical Lectures has encouraged me to publish, now, another volume on an important class of diseases.

In these, as in the former Lectures, my aim has been to teach by examples; to inculcate cardinal points of diagnosis, treatment, and pathology by observations made at the bedside, and by illustrations drawn from suitable cases.

For much of the materials out of which this volume has been formed, I am indebted to several of my former pupils, who, acting as my clinical clerks, and aiding in various ways in chemical and physiological inquiries, have kept the records of the cases which form the basis of the Lectures.

Let me take this opportunity of remarking how important, and I may add, responsible an office in our great hospitals, whether metropolitan or provincial, is that of a clinical clerk. It is not less so as regards the interests of the individual who holds the office, than with reference to the good of the patients, and to the advancement of medical science.

No "Clinic" can be properly conducted with-

out the active co-operation of intelligent and industrious clinical clerks. Nor can any better advice be given to a young man, preparing for the medical profession, than that he should act in this capacity in the wards of a general hospital, even although it may demand a very large portion of his time.

An experience of nearly twenty years as a clinical teacher enables me to express my opinion that, in our London hospitals and schools, sufficient encouragement is not given to students to devote themselves to this best mode of gaining practical knowledge. I would add, indeed, that it is not merely the *best*, but, in truth, the *only* mode of attaining a practical familiarity with disease; for if the student be not officially a clinical clerk, he must be so for himself, in keeping records of the cases which come before him.

It is not likely that the records of cases kept by a young student, as yet wholly inexperienced in the art of observing, would be of any value even to himself in after years. And there is danger lest the unaided observations of such a beginner might lead him into serious errors, which would give his mind an unfavourable bias. It is, therefore, highly desirable that, in defect of a sufficient number of official posts, there should be ample means and appliances in our hospitals (those especially which form parts of medical schools) for directing and assisting students in making

observations, and keeping notes for themselves. Men should work in a hospital, as they do in a laboratory, *under direction:* and the Director should be one who is himself skilled and experienced, and able to teach others, while he is observing and collecting facts for himself.

The London hospitals present a vast field for clinical observation and instruction. They offer, I believe, greater opportunities to the student of medicine and surgery than even the gigantic hospitals of Paris, Berlin, and Vienna, inasmuch as with us the beds are all occupied with important cases, while in the latter institutions many find an asylum who, in this country, would be consigned to the workhouse. But in the foreign hospitals clinical work (under which term I would include observation as well as teaching) is more thoroughly systematized; and they are, on that account, made more available for the advancement of medical science.

A physician, whose mind is thoroughly imbued with the importance of the study of medicine in what I would call a clinical spirit, cannot visit his patients in a hospital and make the necessary inquiries respecting their several maladies without giving clinical instruction to the pupils who accompany him, even although he may offer but few remarks to them. But his class is not likely to derive the full profit from this kind of teaching, unless they follow him regularly and

frequently, and thus become gradually trained to habits of observation. A class constant, as regards the individuals composing it, and spreading its attendance over a lengthened period of time, is quite necessary to give full scope to the teacher; and regularity of attendance on the part of the learner is especially needed, that he may obtain the greatest amount of instruction.

Notwithstanding that there are many physicians and surgeons connected with our London hospitals admirably qualified to give such instruction as I have described, it does not appear to me that the work done in this direction is by any means adequate to our great opportunities; and this, I believe, is due mainly to the existence of certain hindrances arising out of the arrangements connected with the ordinary working of these institutions, which I can scarcely think would be suffered to remain as they are, if the evils to which they give rise were fairly looked at.

The hindrances to which I refer, are—

First—The period of the day at which our hospitals are usually visited. Noon, or soon after, is generally the time fixed upon for this purpose. It is at this hour that men engaged in private business are the most liable to interruption, and punctual attendance is always difficult, and often impossible. Owing also to the pressure of other engagements (and this affects the student as well as the physician or surgeon), the same

quantity of time cannot be given as at the early period of the day, and the visit must be often contracted within the shortest limits.

Secondly—Much impediment is thrown in the way of clinical pursuits by the great number and length of the courses of lectures which students are called upon to attend in the schools. Although, in some degree, curtailed of late years, these may be still further diminished with advantage to both teacher and pupil. For example, how unnecessary in the present state of medical literature are long courses of lectures on the practice of medicine or surgery, or, indeed, on any subject not requiring demonstration and experiment! How much better would it be to confine the lectures on these subjects to the discussion of difficult, doubtful, and important points of pathology and practice, preceded by a sufficient statement of first principles suitable for the uninitiated! And in such lectures care should be taken to indicate the best sources of information, and the most valuable works of reference, and to encourage habits of research and study.*

Men would, under these circumstances, be led

* The lectures of the late Professor Smyth, of Cambridge, on Modern History, seem to me to afford the best model of the kind of prælections which, as applied to Surgery or Medicine or Materia Medica, would at once interest the student, and guide him to study and think for himself.

to read and digest standard authors, to think for themselves, and to discard the system now prevailing (but only of recent growth) of learning manuals by rote. And much of the time now spent in listening to lectures (the greater part of which can be no more than what may be better read at home) might be devoted to hospital work —and the pupil would acquire by his own sight, and touch, and hearing the knowledge which, in the lecture room, he can receive only upon the description and authority of another.

And if, along with such changes as these, the examinations instituted for medical diplomas and degrees were conducted in a manner adapted to test positive knowledge, rather than to encourage a flippant expertness in answering questions, the result would be a greatly diminished resort to the grinding process, and a more healthy and zealous pursuit of scientific and practical knowledge for its own sake. Idle and indolent men would exist under all systems; but with more guidance, and less dependence on the dicta of a teacher, those disposed to work would devote themselves to their pursuits with much more ease, and with a sense of freedom from the thraldom of scholastic routine.

Thirdly—Further impediment to clinical teaching arises from the present meaningless custom of crowding the hospital visits of physicians and surgeons, and sometimes of all the physicians and

surgeons, into one and the same hour. The inevitable consequence of such a practice is a desultory, irregular attendance of the class. To-day, the students throng to see one or two remarkable cases, or grave surgical operations; to-morrow, they rush with equal eagerness after some new curiosity; but the steady, uniform, day after day watching of disease in the hospital wards, is greatly discouraged by this want of method, and the Clinical teacher labours under the disadvantage of not being regularly followed by a class constantly consisting of the same members.

It seems to me that in every hospital there should be clinical teachers specially appointed for that purpose. The office of Clinical Professor may be taken in turns by the hospital physicians and surgeons; and there should be one, or not more than two, constantly engaged in each branch of practice. If there be but one, the visit should take place daily; if two, each clinical teacher should visit on the alternate days. The omission of each alternate day is unfavourable to the clinical watching of patients labouring under acute disease. But the constant attendance of two clinical teachers, two physicians, and two surgeons, appears to me to have advantages which more than counterbalance this occasional difficulty, which, indeed, need never amount to anything more than an inconvenience, inasmuch as abun-

dant opportunity would exist for seeing such acute cases daily.*

In making these remarks—founded, as they are, upon a long experience, and suggested by much consideration of the subject, and, I may add, by great interest in the improvement of medical education—I would not be understood to undervalue what has been done of late years in the clinical school of this metropolis, and of Ireland and Scotland.

The many works which have issued from the press of these countries upon medical subjects

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* At Guy's Hospital, the excellent plan of clinical wards is adopted: all the most important cases are here collected, as well surgical as medical; one physician and one surgeon takes the duty of Clinical Professor, each for three months, and a daily visit is paid. But the medical and surgical wards are visited at the same hour. At University College, there are Clinical Professors, and a practical class is conducted for training the pupils in the art of physical diagnosis, by the various means now within our reach. At King's College, an early "clinic" at nine A.M. has been established, medical on three days in the week, surgical on the alternate days. The celebrated "clinic" of Graves and Stokes, at the Meath Hospital in Dublin, was established at an early morning hour, and at a time quite separate from the surgical "clinic." It speedily acquired an European fame, and notwithstanding that its beds were few, afforded abundant material not only for the instruction of a large class of pupils, but for those numerous valuable lectures and monographs, by which Graves and Stokes have taught their generation.

within the last twenty-five years, show that, notwithstanding great disadvantages, British physicians and surgeons are in no degree behind those of other countries, either in original observation or in research: and this would be abundantly established by a bare enumeration of the names of men now living, who have (each in his own department) contributed to the rapid advancement of medical and surgical science within that period.

And I would especially suggest to those responsible for, and interested in, the advancement of medical education, that in every school, hospital attendance and clinical study should be made the nucleus of the teaching all other subjects, in preference to the existing system, which, in effect, makes it subordinate to the rest. I would, on the contrary, limit and adapt the teaching of other matters to the increased time which ought to be devoted to the clinical study of medicine and surgery.

It will be objected to any proposition for opening more widely our hospital wards for the study of disease, that the more constant attendance of medical students in them will be distasteful and injurious to the patients. I do not believe that such a consequence would ensue. The presence of medical students in our wards, whether assisting in, or witnessing, what is going on there, is one of the best guarantees that the poor

inmates are well looked after. I have never known any patient rendered worse by the presence of a large class, whilst I have seen very many greatly benefited by the kind interest and the careful watching of the young men in attendance. It would be for the physicians and surgeons to give such a tone to the proceedings there, as would afford the most perfect security against any disregard for the comfort and feelings of patients. And I have sufficient faith in the correct and manly feeling of that much improved and improving class, the British students of medicine, to believe that out of such increased facilities of study, they would prove themselves important and valuable auxiliaries in the promotion of clinical investigations.

No one now practising with a knowledge of what medicine and surgery were thirty years ago, will hesitate to admit that in that period both these branches of the healing art have made great advances. How much has been done for diagnosis! How many forms of disease then but little known, are now familiar to the physician! Our power of controlling the progress of disease, how has it not increased! Nay, can we not boast that the course of that scourge of our race, tubercular phthisis, may be retarded, and life prolonged—partly by its earlier detection, partly by the use of new agents! And in surgery, how great are the advances made,

especially in reparative and conservative surgery! How admirable the means now used,—suggested, indeed, long ago, by Park, adopted early by Crampton, and others,—to save limbs formerly devoted to destruction! and how successful have these means been in the hands of Jones of Jersey, and our best hospital surgeons!

Truly, if much has been done, there is yet much more to do. Let us interest and employ as many as possible in this work of Clinical research; and especially let us enlist young minds, while they are yet free from the baneful influence of routine.

St. Bartholomew's Hospital,
January, 1857.

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CLINICAL LECTURES,

ETC.

LECTURE I.

On Hæmaturia.

THE subject of hæmaturia appears a suitable one for my clinical lecture to-day, gentlemen, because there are now in the hospital four cases exhibiting that condition of the urine. These will afford us a favourable opportunity for studying some points in the clinical history of this form of hæmorrhage.

Before entering upon the detail of these cases, let me premise that hæmaturia is only a symptom, and, like all cases in which the symptoms have given rise to the nomenclature, it will draw into its consideration all those conditions which are capable, as agents, of producing it. To illustrate to you how this may arise in various ways, and to point these out, will be the principal object of my lecture to-day.

I need scarcely remind you that the amount of blood found in the urine varies from a small quan-

tity, occasioning scarcely any discolor
urine, or giving rise in a greater or le
that peculiar smoky hue, as if the urine
with soot, which is generally very cha
the presence of blood in this secre
such a quantity as gives the urine a
decided red colour. When there i
blood, the reaction of some of the in
the urinary excretion darkens the colou
and gives the peculiar smoky hue; b
blood is abundant, this change of colou
only to a very limited extent.

Nor need I dwell upon the means
and determining the presence of b
urine; the various tests necessary for
you will find detailed in all the elem
upon this subject. I shall content
remarking, that the microscope aff
the readiest and the surest means of
the point in question, especially wh
examine specimens quite recently voi

When the practitioner has dete
there is blood in the urine, his ne
important object of inquiry is—*what*
of the blood? How comes it to be

* Dr. Johnson's valuable book *On D*
Kidneys, Dr. Odling's *Practical Chemistry*
John Bowman's *Medical Chemistry*, and D
On the Microscope, ought to be in the h
student and practitioner.

the urinary secretion? It may come from the fountain-head itself of that fluid, and be poured out from the Malpighian bodies simultaneously with the watery element of the urine, or it may be mixed with the urine, merely from that fluid flowing over or near a bleeding surface: thus blood escaping from any other part of the kidneys than the Malpighian bodies, or from the ureter, the bladder, or urethra, will readily mix with the urine; and lastly, in women the catamenial blood, or any hæmorrhagic flux from the uterus, will occasion hæmaturia.

The last case we may dispose of first and summarily. In all cases of hæmaturia in the female, you will of course satisfy yourselves of the condition of the uterus, and if there be uterine hæmorrhage of any kind, you will have to suspend your judgment respecting the source of the blood, until the flow from the uterus shall have ceased, unless indeed there be symptoms present which clearly and unequivocally refer to the bladder and kidneys as *likewise* a source of hæmorrhage. Fortunately, the internal remedies directed against the uterine hæmorrhage are likely to prove equally beneficial when the blood comes directly from the urinary organs themselves.

The most important point of diagnosis in hæmaturia, is to determine whether the blood flows from the bladder or from the kidneys; in other words, we must distinguish *renal* from *vesical*

hæmorrhage. This is sometimes difficult; but frequently it is sufficiently plain. If the blood come from the bladder, there is generally some local pain on pressure, or some disturbance of the functions of that reservoir, as denoted by pain before or after passing water, or by frequency or difficulty of micturition. The blood, in cases of this description, is apt to form clots in the bladder, which sometimes impede micturition; it is not uniformly diffused through the urine, as in renal hæmaturia; and in evacuating the bladder, the urine comes away, at first either of its natural colour or very slightly reddened, but the last portion of it is deeply coloured, and often seems to consist solely of blood: sometimes, indeed, pure blood, either liquid or in clots, or in both forms, comes away at the end of the micturition.

Again, what are the symptoms which will lead you to think that the blood comes from the kidneys? In such a case, you will naturally expect to discover some indications of renal affection—as pain in the lumbar region, particularly if felt over one kidney; you will likewise find the blood uniformly diffused throughout the urine; there will be often, though not always, an absence of clots, the urine being alike throughout, and that passed early being just the same as that voided at the end of the stream. There is an important exception to the absence of clot in renal hæmorrhage, and that is, where the blood flowing

from the kidney, independently of the urine, coagulates in the infundibula or the ureter, so as to form moulds or casts, which are afterwards forced into the bladder, and thence expelled in micturition. Such casts sometimes cause considerable pain, like that of calculus, in their passage down the ureter. Further aid in the diagnosis between renal and vesical hæmorrhage is obtained by the use of the microscope. If the blood comes from the bladder, we may see more or less of vesical epithelium mixed with the blood particles: this form of epithelium is flat and scaly, and sufficiently easily distinguishable from that of the kidney, which would be more likely to be present when the hæmorrhage originates in that organ; the renal epithelium being more or less globular, and frequently accompanied by, and entangled in, small casts of the uriniferous tubes.

When either kidney is the source of the blood, we often find, under the microscope, casts of the renal tubes, formed of coagulated blood—*blood casts*, as they have been called. The presence of these affords unequivocal proof that the blood comes from that source. But such a sign is seldom obtained satisfactorily.

Every now and then you will meet with cases in which you can get no conclusive evidence to enable you to determine whether the blood comes from the bladder or from the kidney. There will be no symptom pointing to either organ, and the

urine will come away freely, thoroughly charged with blood, and without clots. In such cases the probability is that the bladder is the source of the bleeding, and that the blood pours from a highly vascular fungus growing upon some part of the vesical mucous membrane, or from that membrane itself, which may be unduly charged with blood, and so tender, that solutions of continuity are easily effected in it. The continuance of the hæmorrhage generally clears up the doubts in the diagnosis, by giving time for the development of decided disturbance of the functions of the bladder.

A source of fallacy may arise in the fact that blood freely poured from the kidney into the bladder is capable of giving rise to inflammation of that organ, and a free secretion of mucus and pus causing the urine to become alkaline. The occurrence of such symptoms is very embarrassing, and demands great circumspection with reference to the diagnosis.

Having said thus much on the general rules that are to be observed in our diagnosis of hæmaturia, let me now proceed to the details of the cases to which I have particularly to direct your attention to-day.

Case I.—The first case is a remarkable one. The patient, William Burrowes, æt. 23 (vol. xxiii. p. 209), was admitted into Sutherland ward on

the 2nd of June, 1848, labouring under rheumatic fever; and he is now (June 13th) suffering from that disease, accompanied with severe pericarditis. Almost from the commencement of the rheumatic symptoms, this man had passed blood in his urine; and when he was admitted his urine contained, in addition to the blood, lithates in large quantity. The hæmorrhage is gradually getting less, but not until the amount of blood lost has been very great. This I consider a very peculiar case—such a one, indeed, as is rarely met with; and from the large quantity of lithates (evidence of an irritated state of kidneys), and the absence of vesical symptoms, I did not hesitate to say that the blood came from the kidney.

The diagnosis of renal hæmorrhage in this case is founded on the absence of symptoms referable to the bladder, the non-existence of clots, and the uniform coloration of the urine; and it is supported by the history of the case, which shows that at the commencement of the attack of rheumatic fever the kidneys were the seat of, to say the least, a morbid effort in the formation and discharge of lithates in large quantity, and that the patient then experienced a considerable sense of weight referred to the region of the kidneys. It is probable that both kidneys were the source of hæmorrhage, because the sense of weight was referred to both sides, and since the exciting cause of the bleeding, which I shall presently

explain, is more apt to affect both kidneys than one only.

The microscopic examination of the urine in this case afforded no help, for it revealed no more than numberless blood-corpuscles and granules of lithate of ammonia.

Now what can be the cause of the hæmorrhage in this instance? You may remember that I have often told you in former lectures that it was common to find, in the course of certain diseases dependent on the presence of morbid matters in the blood, more or less irritation of the glands, through which these poisonous substances are eliminated. The glands especially concerned in the elimination of the poison of rheumatic fever are the kidneys; and, in the present case, the irritation of these organs has been extreme. As a result of it, there takes place a great afflux of blood to them; and if the engorgement attains a certain intensity, the delicate vessels of the Malpighian bodies give way, and the blood escapes.

There are many circumstances which prove that hæmaturia may be caused by the irritation of the kidneys, excited by a substance which can reach these glands only through the blood. It is well known that both turpentine and cantharides will irritate the kidneys, when administered in large doses. Cantharides in small doses excites the kidneys and increases the secretion of the urine, but the excessive excitement produced by

large doses diminishes the flow of urine, the state of engorgement being too great to be compatible with the healthy functions of the organ; finally, the vessels yield, and hæmorrhage is the result. The effect of turpentine is very similar. And when you examine the kidneys of patients who have died after taking turpentine, you find many of the uriniferous tubes and of the Malpighian capsules full of blood, the precise source of the hæmorrhage being thus clearly displayed.

In such a case as that of our patient Burrowes, the kidney is brought into a similar state of exalted nutrition, or hyperæmia, or active congestion, by, most probably, an eliminative effort. A morbid matter generated in the blood (lactic acid, if we agree with Prout) makes its way out of the system through various channels, of which the skin and the kidneys are the chief. The ordinary nutrient changes of these organs (for so we must call the skin in reference to its secretory function) are thus greatly disturbed; the sweat becomes excessive and highly acid, and it acquires a peculiar and characteristic odour; the urine diminishes in quantity, increases in density, its colour becomes much heightened, and lithic acid alone, or in combination with soda and ammonia, is freely generated. No doubt the kidneys (which are among the most vascular organs of the body), if examined at this stage, would be found highly charged with blood, as the affected

joints are. In certain cases, then, the walls of the minute blood-vessels, having too little power of resistance to withstand the pressure of the blood, give way, and more or less hæmorrhage ensues. Such I take to be the rationale of the phenomena in the case of Burrowes.

The principal indication for treatment in a case of this sort is to promote active elimination by other emunctories besides the kidneys, and so to relieve these organs as much as possible. Thus it will be necessary to excite the action of the skin by diaphoretics; of the bowels by purgatives. Counter-irritation over the region of the kidneys may also be advantageously employed, or, if the patient is robust, a small cupping may be of use; but the strength of the patient and the amount of the hæmorrhage should always be carefully taken into account prior to the application of this remedy.

In this case we should not have been justified in taking away blood, the patient having been already greatly anæmiated. Occasionally, however, the rapid and sudden abstraction of a small quantity of blood appears to put a stop to the hæmorrhage at once. This acts, perhaps, on the principle of revulsion, or of counter-irritation. If you have recourse to counter-irritants, you must be careful to employ mustard, and to avoid turpentine and cantharides the active principles of which, even when they are applied to the skin, are readily absorbed, and may

exercise a pernicious influence on the urinary organs.

In the case of Burrowes I was content to deal simply with the rheumatic fever, and not to employ any special treatment for the hæmaturia. Regarding this symptom merely as one of many local irritations caused by the rheumatic poison, I felt that the general constitutional treatment ought to mitigate the renal irritation, as it was expected to diminish that in other parts. And the result justified this view; for, as the rheumatic symptoms declined under opium and alkalis, so, *pari passû*, did the hæmorrhage. It continued very abundant for several days, and then gradually diminished, until there was no further indication of blood than the well-known smoky hue. This lasted a considerable time, and did not entirely disappear, until the patient was nearly convalescent.

Let me, *en passant*, call your attention to a circumstance in this case that is especially worthy of your notice; it is the obstinacy which the rheumatic symptoms exhibited, and probably will yet exhibit, as contrasted with the case of the woman I referred to in a recent lecture on rheumatic fever, in whom the eliminatory plan of treatment was exclusively adopted. That woman lost no blood, and, although she had active inflammation of the pericardium, and the fever was of a very intense character, she proceeded rapidly to

convalescence, with scarcely a bad symptom. This man has lost blood in large quantities from his kidneys; the bleeding began at a very early period of the rheumatic attack, yet it has not sufficed to keep off a severe attack of pericarditis, in which not only lymph was deposited, but a large quantity of liquid effusion was poured out, accompanied by severe dyspnœa; nor has all this loss of blood saved our patient from swollen and exquisitely painful joints, into each of which copious effusion has taken place. On the contrary, the articular, as well as the cardiac symptoms, have been much less tractable than usual, and have resisted the treatment employed with an obstinacy which contrasts remarkably with the readiness with which similar affections, in the case already quoted, yielded to a similar treatment. Now I do not say that the phenomena of this case justify us in at once inferring that they were due to the loss of blood. All that I wish to impress upon you is, that the early removal of blood has not in this case had the effect of arresting the rheumatic state; it has, in truth, appeared to aggravate and prolong the rheumatic symptoms. This patient remained in the hospital till July 22nd, when he was discharged quite recovered.

Case II.—The second case is likewise well worthy of your attention, as an instance of hæmaturia accompanying and forming the sequel to a

very formidable disease—namely, inflammatory dropsy, or dropsy arising from inflammation of the kidney.

J. Pickford, æt. 40, a labourer (vols. xxiv. and xxiv. A), was admitted into the hospital on the 15th of May, 1848. His habits have been temperate, but he seems to have been getting into a bad state of health for some time past, as he had abscesses in his axilla and elsewhere a fortnight before his admission. Soon after these appeared, œdema came on, first in his feet, but very soon afterwards in his upper extremities and face: finally, the effusion took place in his scrotum and abdomen; and when he entered the hospital he was universally dropsical. One of his most prominent symptoms was scantiness of urine, which did not amount to more than from three to four ounces in twenty-four hours; of specific gravity 1020, very much charged with blood, and becoming nearly solid by the addition of nitric acid: so small was the quantity of urine that for two or three days I feared that a total suppression of the secretion was likely to occur. However, on the 17th, the quantity increased to eight ounces; on the 18th, it was six ounces, of specific gravity 1025; on the 21st, seven ounces; on the 22nd, it rose to sixteen ounces, nearly half the normal quantity; on the 23rd, he passed twelve ounces; and on the 24th, twenty ounces. Throughout this period the urine contained blood-corpuscles

in great numbers; it was free from crystals of any kind, but contained a great number of fibrinous casts and particles of renal epithelium, which left no doubt as to the blood having its source in the kidney.

The state of the kidneys in this case was probably owing to exposure to cold, but the attack could not be traced to any particular instance of exposure. Cold is the most common cause of this state of kidney, especially if accompanied with a rapid or sudden suppression of sweat. Under these circumstances, it is very reasonable to assume that some morbid material is retained in undue quantity in the blood, which irritates the organs through which it is eliminated; of these, the kidneys suffer most, partly from their highly vascular and delicate structure, but chiefly because, in all probability, the greatest part of the morbid matter makes its way out through them. In this way an irritated and inflamed state of the kidney is induced, which sometimes terminates in destructive disease of the organ.

The indications for treatment afforded by a case of this kind are very obvious: they are to restore the defective action of the skin—to soothe and relieve the irritation of the kidney—and to promote the elimination of water from the system.

We have in the hot-air bath a very valuable and ready means of exciting the action of the

skin: this was consequently used with our patient from the beginning, and with the effect of promoting sweating, while he was in the bath, as well as afterwards. After the hot-air bath has been frequently used, it produces a state of great debility; and this constitutes the chief difficulty in continuing it, in order to gain the greatest benefit from it. In this instance I carried into effect the practice of dashing the patient with cold water immediately upon his coming out of the bath. The effect in this, as in other cases in which I have tried the plan, was certainly to give the patient a greater tolerance of the remedy, and, at the same time, by the reaction which succeeded the cold dash, to cause more active sweating on his return to bed.

With the hope of relieving the active congestion of the kidney, our patient was cupped over the loins, and several ounces of blood were taken away. I cannot say that he derived any benefit from this: and, I must confess that in the treatment of similar cases I have been more frequently disappointed than satisfied by topical bloodletting, when the congestion of the kidney was active. I suspect that as long as the morbid matter is undergoing elimination through the kidney, and keeping up irritation of the gland, local bloodletting does little or no good. If a particle of dust gets into the eye, it excites conjunctival inflammation; you may leech the eye, day after

day, until your patient is blanched; yet active congestion of the conjunctiva will continue; but remove the particle of dust, and the congestion will quickly subside. So with the kidney,—you will do more to relieve the active congestion of which it is the seat, by opening new channels for the elimination of morbid matter—restoring and promoting the action of the skin, and increasing that of the bowels—than by the withdrawal of blood. But when these evacuations have been some time in action, and the congestion of the kidney has assumed a passive character, then the removal of blood by cupping, or by leeching, will often succeed in relieving the congestion.

The third indication, that of promoting the elimination of water from the system, is in some degree fulfilled by the sweating process; but the use of drastic and hydragogue purgatives supplies us with a very efficient means of getting away a considerable quantity of fluid through the intestinal canal. For the generality of cases you will find that which we employed in this case the most efficient remedy of this class—namely, the compound powder of jalap: it is a safe, and sufficiently active medicine. In other instances, the compound gamboge pill will suffice; or elaterium may be resorted to, but this is a much more violent remedy and often uncertain, owing to the difficulty of procuring it in a state of purity.

After the inflammatory condition of the kidney had been subdued, and the organ began to resume its secreting activity, as shown by an increase in the quantity of the urine, the bitartrate of potass was exhibited in diuretic doses. Now this would be apparently an unscientific plan of treatment, if this medicine be supposed to exercise any direct stimulating influence upon the kidneys. It is probable, however, that its diuretic powers may be due to some chemical or physical change which it produces in the blood, whereby the exosmose of water through the Malpighian vessels is favoured. On this view no objection can exist to the employment of this remedy in inflammatory states of the kidney: and, indeed, experience tells so much in its favour, that we should not be justified in abstaining from employing it, merely on account of an hypothesis, which may or may not be well founded.

The renal hæmorrhage in this case appears to have been, up to the time when the kidneys began to act more freely, due to the state of inflammation into which the gland was thrown; as the urine began to flow, the hæmorrhage diminished considerably, but did not cease. On the 30th of May the secretion of urine was fairly re-established; on that day our patient passed two pints and twelve ounces of urine; on the 31st, two pints and eighteen ounces; on June 1st, three pints; after this the blood began to appear

in the urine in increased quantity; and on the 6th of June the amount of urine passed fell to thirty ounces; on the 8th, to twenty-eight ounces. And now the hæmorrhage returned with greater violence than ever, so much so that the urine seemed almost like pure blood, and contained not only multitudes of blood corpuscles, but also peculiar casts of uriniferous tubes, such as we know are thrown off in the state of chronic nephritis. The condition of our patient at this time I viewed to be as follows:—The active congestion of the kidneys has passed away; the acute stage is over, and a chronic nephritic condition has been established. Moreover, he has fallen into a *hæmorrhagic state:* he has become pale, his blood thin, and its nutritive powers no doubt greatly impaired, in consequence of which the vessels of the kidney have become weaker, and, therefore, less able to maintain their integrity in opposition to the pressure of their contents. In accordance with this view I determined on altering the plan of treatment, abandoning all antiphlogistic diuretic remedies, and having recourse to the use of stimulants, astringents, and support. I therefore gave him plenty of nutritious food and port-wine, and applied counter-irritation, by mustard poultices; and as a styptic he has taken gallic acid, in four grain doses, three or four times a-day. This treatment seems so f to have had a very good effect; the hæmorrha

has decreased considerably, and is fast disappearing.

[It was not until the 15th of August, fully three months from the commencement of the treatment, that this patient had recovered so completely as to justify my sending him out of the hospital. The blood had quite disappeared from his urine, and there remained but a trace of albumen. All signs of anasarca had been absent for some time.]

Case III.—I shall add another case, remarkable for the amount and duration of the renal hæmorrhage, which also originated in that inflammatory state of kidney, which favours the production of general dropsy.

Francis Speight, æt. 35 (vol. xi. p. 218), a porter; by his occupation much exposed to the changes of weather. Admitted Oct. 9th, 1844. This man got wet a fortnight before his admission, and was affected with a pretty extensive catarrh. A week after this he found his face and both arms swollen, and in two or three days the swelling extended to the legs. He now became troubled with headache, and unable to attend to his business. He was bled, but without relief, and then sought for advice at the hospital.

On his admission he exhibited all the usual appearances of general dropsy; anasarca of the legs and face, and of the upper and lower ex-

tremities; of the scrotum to a considerabl tent, as well as of the abdominal integum and a small quantity of fluid was likewise det in the peritoneal cavity. The quantity of secreted in the day was very small, it ha decided smoky hue; its specific gravity was 1 and it became nearly solid by heat and n acid.

Under the use of the hot-air bath, diuret such as acetate of potass, digitalis, bitartrate potass, the urine increased in quantity and di nished in density; but from being smoky it sc became increasingly red, until, on the 24th, assumed the colour of blood, so highly charg was it with that fluid. On that day its speci gravity was 1022.

The dropsical symptoms showing no marke tendency to increase nor yet to subside, and th patient becoming decidedly blanched from loss c blood, the restraint of the hæmorrhage appeare to me to be the most urgent point of treatment Accordingly we began the use of various reputed styptics. Acetate of lead was first tried; this very soon produced a well-marked blue line upon the gums, but no other effect. After a week's trial it was abandoned for the tincture of sesquichloride of iron, which was given alone in water, in doses of fifteen minims, thrice a day, for four days; after this, it was continued for three days in combination with tincture of digitalis and

tincture of opium. These remedies seemed to have no effect whatever in restraining the hæmorrhage. The quantity of fluid passed from the bladder (blood and urine) is described as copious; unfortunately it was not accurately measured. On the 9th of November, the hæmorrhage being as great as ever, and the dropsy undiminished, I resolved to give tannin, and at the same time to administer port-wine freely. He was ordered three grains of tannin in an ounce and a half of decoction of uva ursi thrice daily, and he was allowed six ounces of port wine. He had beef tea and farinaceous food liberally. The bowels were kept open by occasional enemata, and a dose of compound powder of jalap now and then.

On the 11th the dose of tannin was increased to six grains, and on the 14th to ten grains. At this date eight ounces of port-wine were allowed. The patient was quite blanched, and had a decided hæmorrhagic look, and the dropsy continued much the same.

The reports, however, soon began to be more favourable. The œdema became less; and while there was no diminution in the quantity of the urine, its colour became paler, and the quantity of blood seemed to diminish. On the 21st the specific gravity of the urine was 1007; its quantity copious, and it contained less blood and albumen. The dose of tannin was now increased from ten to fifteen grains.

From this time to the 7th of December a steady diminution of the hæmorrhage took place; and on that day the tannin was given up; and, in consequence of the extreme anæmia of the patient, citrate of iron was administered in doses of five grains thrice a day. The anæmia was now so great that, in addition to the usual blanched appearance of the skin and mucous membranes, venous murmurs were audible, and the patient was greatly troubled with buzzing noises in his ears.

After another month's treatment of this kind the hæmorrhage had ceased, the dropsy was quite gone, urine, of specific gravity 1013, was abundantly secreted, and it contained a very slight quantity of albumen. He had gained so much i general health that I consented to his leaving th hospital on the 4th of January, after a sojourn i it of nearly three months, during two of which h was passing blood in large quantities from th kidneys.

It is important to mention, in concluding the narrative of this case, that the patient became an inmate of the hospital three times in the four subsequent years for various complaints, and that opportunity was thus afforded for examining the urine and investigating the state of the kidneys, and that on each and all these occasions no evidence of disease of the kidneys could be

obtained. The urine was found to be perfectly normal.*

CASE IV.—A fourth case is that of a boy named James Taylor, æt. 4 years, who is labouring under dropsy after scarlet fever (vol. xxiii. p. 214). I call your attention to it now because it affords another instance in which irritation of the kidney, from the presence of a poison in the circulation, some of which is being eliminated through the gland, gives rise to renal congestion and hæmorrhage, and causes albumen to appear in the urine, even after the red particles of the blood have ceased to show themselves in it. We now and then find it produced in the early stage of scarlet fever, even when the eruption is well out; but in general it does not appear until the desquamative stage, *i. e.*, whilst the poison is passing out of the system. It is in

* Four years, however, after the last admission of this patient into the hospital, he again entered it, in January, 1852 (vol. xxxv. p. 130), labouring under general dropsy and albuminous urine, brought on by a severe wetting. He left the hospital free from dropsy, and with his urine slightly albuminous, after a sojourn of two months. He was again admitted in the spring of the present year (1856) for a similar attack, and nearly died from suppression of urine. He left the hospital, however, free from dropsy, but with urine still albuminous, and with indications of renal degeneration.

the cases in which the eruption has been trifling and has not come out freely, or at all, that th kidneys are most apt to be affected, the work elimination being thrown chiefly upon them, an very little on the skin. Often the patient ma have got well through the fever, and may have ha a good convalescence: he goes out, is exposed cold, and the next day dropsy appears, bringing i its train all the other symptoms of renal co gestion.

This little boy does not appear to have had an rash. He was admitted with general dropsy the 3rd of June, and the following history of hi was obtained. During the last month his brothe and sisters have had scarlet fever; but although co stantly with them, he did not seem to take it; has had no sore throat, nor rash, nor any oth symptom of the fever until three days ago, when abdomen was observed to be much larger th usual, and his ankles, legs, and face swelled. his admission fluid could be detected distinctl his abdomen, and the anasarca was general. urine was very scanty, and contained blood albumen.

Now the treatment in such cases, and w we adopted in behalf of the boy Taylor, be conducted on much the same principl in the case which we have last considere flammatory dropsy: namely, to relieve irri and promote the elimination of water, and

cautious use of warm baths to increase the action of the skin. I do not advise you to have recourse to early local bleeding in these cases; but if the congestion of the kidney linger after the greatest quantity of the poison may be supposed to have been eliminated, then you will often find benefit from the local abstraction of blood in quantities so small as not to affect the general strength of the patient. The urine continued to present the smoky hue, and to contain blood-discs up to the 17th, although it had increased in quantity. Two leeches were then applied to the loins, and immediately afterwards the smoky colour of the urine began to diminish, and very soon disappeared. This boy was discharged cured on the 4th of July.

Case V.—The fifth instance of hæmaturia to which I shall refer to-day, is a remarkable case. It was especially difficult to assign a cause for the hæmorrhage, unless it may have been vicarious of the menstrual discharge, the kidneys being already in a morbid state. The patient, Mary Parsons, sixteen years of age, having never menstruated, was admitted into the hospital May 22nd (vol. xxiv. p. 208). Two months previously, blood began to appear in the urine, without any apparent cause, and she experienced pains in her limbs, supposed to be rheumatic, which shifted from one part to another: from this time she has continued to pass blood in increasing quantity, so that the

urine soon came to be quite of the sanguineo colour. By the loss of so much blood she h now become blanched. A venous murmur w audible in the neck, but we did not hear a bellow sound over the base of the heart, or in the arteri There were no vesical symptoms, the blood w uniformly mixed with the urine, and came aw as freely at the commencement as at the tern nation of micturition, nor did the urine conta any clots.

The uninterrupted discharge of the large qu tity of blood which this girl had been passing so long a period, without a symptom referabl the bladder, or to any other neighbouring org left in our minds no doubt that the kidney the source of the hæmorrhage. The microsc discovered multitudes of blood-corpuscles, numerous crystals of oxalate of lime. How l these latter existed we were unable to determi Their presence in the urine betokened an irrita condition of the kidneys, which would have recei full confirmation, had casts of the tubes and e thelial particles been observed.

It was difficult to fix upon a cause for t hæmorrhage. Renal calculi do not occur at early an age. But there were two circumstan in the case which arrested attention: one w that she had scarlet fever two years before, althou we could not learn with certainty that dropsy isted; the other, that the catamenia had not

appeared. Now it is possible that the kidneys may have been the seat of a hæmorrhage vicarious of this function, as the stomach and bowels often are, while the chronic irritation of the kidneys—the sequela of scarlet fever—may have determined the hæmorrhage to these organs. After the hæmorrhage has once been established, especially in an irritated organ, it is not difficult to conceive how it may be readily kept up: the blood becomes poor and the vascular system weak, and a general hæmorrhagic tendency is established, while the derangement which the kidney has suffered from the original attack, determines that organ as the seat of the continued bleeding.

From the long duration of the hæmorrhage in this case (two months), and the state of extreme debility to which the girl was reduced, I was anxious to improve the state of her blood as much as possible, and to check the bleeding. She was well supported, had a moderate allowance of port-wine daily, and took astringents—lead, gallic acid, tannin, the tincture of the sesquichloride of iron. The hæmorrhage, however, showed no disposition to stop; it diminished for a little while, but returned again with as much intensity as before. She is now again taking gallic acid, in large and frequently-repeated doses. If the hæmorrhage does not soon cease, I intend to try some of the terebinthinate medicines, which are supposed to exercise a styptic influence. There is no doubt

that they act favourably as styptics in intestinal hæmorrhage, but in renal hæmorrhage their power is much less certain, and they are, moreover, very apt to excite irritation.*

The cases which I have now detailed to you afford good examples of a common and an important form of renal hæmorrhage, and have an interesting bearing on the general doctrines of hæmorrhage.

In all the cases, the primary cause of the hæmorrhage appears to have been an inflammatory, or, at least, an irritated state of the kidney. In the case of Burrowes (Case I.), you have hæmorrhage due to simple irritation; Cases II., III. and IV. afford examples of an inflammatory state of the kidney; whilst in III. and V. you find an inflammatory state ending in a cachectic condition, which favours the continuance of the hæmorrhage:

These cases likewise indicate very distinctly two

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* The necessity for great caution in the use of these remedies is shown by the sequel of this girl's case, which terminated, some time after this lecture was delivered, in her death. The hæmorrhage resisting all the ordinary remedies, five drops of spirits of turpentine were given three times a day. In the course of two days this remedy was followed by strangury, and a great diminution in the quantity of the urine. This was followed by a low febrile state, with oppressed brain, in which the patient died. The kidneys were in a state of chronic nephritis.

ways in which hæmorrhage may occur, and so far they serve to illustrate the general doctrines of hæmorrhage. Whatever produces a state of hyperæmia predisposes to hæmorrhage. That altered state of nutrition, which we call inflammation, would, therefore, take a high place among the causes of hæmorrhage. Inflammation, consisting, as it does essentially, in an exalted *vis à fronte*, attracts blood largely to a part, and so fills the capillary vessels, in some places to the actual bursting of their walls, and the consequent escape of blood. Pneumonia furnishes a good example of this form of hæmorrhage, and the sputa in this malady acquire their rusty colour by the intermixture of the escaped blood with the mucus of the air-passages. So also an inflammatory state of kidney, by inducing active hyperæmia, causes effusion of blood which mingles with the urinary secretion. These, then, are examples of *active* hæmorrhage. The cachectic state which follows a long continued hæmorrhage, as in the case of Speight (III.) or of Parsons (V.), by impoverishing the blood and weakening the coats of the vessels, impairs the inherent forces of the capillary circulation, and induces local passive hyperæmia, or passive congestion, and passive hæmorrhage, from the giving way of the weak and ill-nourished walls of the vessels.

But in using the term passive hæmorrhage, I must beg you not to understand me as admitting

a distinction which some pathologists draw, namely, that it is a hæmorrhage which takes place by the *filtration* of the blood through the coats of the capillaries without their rupture. Such an hypothesis as this I have always considered and long taught to be quite untenable; were it possible for the blood-corpuscles to pass through the coats of the capillaries, the latter would have pores, which would be visible by the microscope. This distinction I would, however, make: in *active* hæmorrhage the rupture of the vessels arises from the attraction of an inordinate quantity of blood to them; in *passive* hæmorrhage the same rupture arises not simply from the quantity of the contained blood, but rather from its depraved quality, and the ill-nourished and weakened condition of the coats of the vessels themselves, which give way on the slightest increase of pressure. And I would especially direct your attention to the fact that the hæmorrhage of the *active* form may, by long continuance, or by any cause tending to impoverish the blood and to weaken the general nutrition, degenerate into that of the *passive* kind.

Not to make this lecture too long I shall postpone to another occasion the remarks which I have to offer on other forms of Hæmaturia, and on the treatment of this affection.

LECTURE II.

On Hæmaturia.

GENTLEMEN,—In the last lecture I detailed to you narratives of cases to indicate and illustrate a most important form of renal hæmaturia, namely, that which depends on an irritated or inflammatory condition of the kidney. And we also illustrated, and, I think, established, the fact that the *active* hæmorrhage excited in the irritated and inflamed organ may, by impoverishment of the blood, and by weakening of the coats of the vessels, degenerate into a *passive* hæmorrhage of a very chronic kind, which is often exceedingly difficult to cure.

It is an interesting subject of pathological inquiry to ascertain why, in the various cases to which I referred in my last lecture, the kidney should be the seat of so much irritation. These cases occur in individuals who have been much exposed to cold or wet, and who may, therefore, be reasonably supposed to have experienced a decided check to or suppression of the action of the skin. They occur notoriously in patients who have imbibed the poison of scarlet fever. These are the two conditions—namely, exposure to cold

and wet, either or both, and the inf
scarlet fever, which most commonly pr
form of hæmaturia under our considera
its consequences, albuminous urine, an
and inflammation of the uriniferous tul
kidney. Cases of this kind, therefore
grouped together as typical of a specia
hæmaturia. Analogous cases are met w
analogous states of constitutional dis
Now and then, hæmaturia, with signs of
kidney, but without dropsy, is met with
fever. In the preceding lecture I have
instance of hæmaturia associated with
fever.* Irritated kidney, too, is a freq
comitant of acute gout, and even of t
diathesis, although not always, nor ve
accompanied with hæmaturia; it will oc
times in small-pox, and I have already
to the well-known fact, that certain
irritants of the kidney—when introduce
stomach will pass off by the former o
in their escape irritate it and cause it to

With these facts before us, it seems
difficult matter to frame a reply to the
I have suggested, namely, why in the
cases under consideration the kidney
the seat of irritation? The appropria
seems to me to be the following: that in t

* Case I., p. 6.

the blood is the seat of a foreign material, which having an affinity for the kidney, is drawn to that organ and acts upon it as an irritant, just as cantharides or turpentine would. The scarlet fever poison, or the poison of typhus or of small-pox, may operate in this way; and from its affinity, especially that of the scarlet fever poison, for the gland, it may use the kidney as one of its channels of elimination from the blood. So also the rheumatic and the gouty matters irritate the kidneys, and escape from the system through these organs. And in cases of inflammatory dropsy, due to exposure to wet or cold, and perhaps checked perspiration, nothing is more likely than that, under the influence of the arrested or impeded secretion of so important a gland as the skin, some element of the perspiration may be retained in the blood, or some new compound formed in it which may operate as an irritant poison upon the kidneys.

But, important although this discussion undoubtedly is, and glad as I should be to go more freely into it with you, I must not pursue it further, since my object in these lectures is to bring before you matters of clinical rather than of pathological interest. Still, we must on no account entirely exclude questions of pathology from our consideration when studying clinical medicine: if you do so, you run the risk of becoming blind routinists, and careless and aim-

less practitioners; and your attention will be wholly directed to the tedious minutiæ of symptomatology, or to the framing of tables of statistics, and you will be led to neglect the true aim of the physician, namely, diagnosis and treatment.

Let me now proceed to some other forms of renal hæmaturia. And first I shall allude to those which accompany an inflammatory state of the kidney.

There are two forms of inflammation of the kidney. In the one, the seat of morbid action is the uriniferous tubes. This is, undoubtedly the most common and the least destructive for and that from which recovery takes place mo frequently and most completely. It is analogo to the inflammation of the mucous membrane the infundibula and pelvis of the kidney, a the ureters, which is known by the name *pyelitis*. Of the hæmorrhage connected with form of renal inflammation, I have already g you examples in the previous lecture. inflammation of the kidney from expos cold, that from scarlet fever, and from poisonous influences, all belong to this categ

The second form of renal inflammation i which may be called phlegmonoid. It is the phlegmonoid inflammation elsewhere seizes upon a patch, or even two or patches of the organ, and rapidly destroy them, involving all the tissues—tubes,

vessels, connecting tissue, mucous membrane—in one common slough. This is its main character, that it rapidly passes into the sloughing and suppurative process. The separation of the slough leaves a pus-secreting cavity, whence successive quantities of pus are discharged with the urine.

You will find, in practice, that the phlegmonoid inflammation either follows the impaction of a renal calculus, which acts like an irritant foreign body, or that it occurs, much as a furuncle or carbuncle is formed in the subcutaneous areolar tissue, without any assignable cause, as if some powerful irritant and destructive agent were arrested in the circulation at the points affected.

There is nothing in pathology which seems to be more mysterious, as to its causation, than a common boil. A man, in apparently perfect health, finds a small point on his arm or thigh become irritable; he is led to examine it, and finds a minute vesicle containing a straw-coloured fluid, and surrounded by a faint blush. In a few hours this becomes hard and painful, and by-and-by the centre, which had been the seat of the vesicle, becomes prominent, thins and looks yellow, and ultimately a slough issues from it, leaving a cavity which soon contracts, and a cicatrix is formed, marking the position of the destroyed tissue.

It seems highly probable that when sloughs

and suppurating cavities are formed in internal parenchymatous viscera, they occur under pathological conditions and with morbid phenomena similar to those of the common boil. This seems especially to apply to abscesses of the liver, of the brain, and to those of the kidney, formed as I have just described. There is, however, this difference between the sub-cutaneous boil and that of the internal viscera, that, in the former, the separation of the slough is the signal for the commencement of a contracting and healing process; but, in the latter, owing, perhaps, to the difficulty of ensuring the complete and rapid evacuation of the slough, and of the matter formed with it, this healing process does not generally take place, but the cavity left by the slough continues to secrete pus, emptying itself from time to time, as in the kidney, when it communicates with the ureter, and becoming refilled to be again emptied; or, as in the liver or brain, finding an exit through some outlet, which in the former tends often to save, in the latter generally to destroy, the patient.

Let me now remark (excusing, as I hope you will do, this digression), that the hæmaturia wh accompanies this phlegmonoid inflammation the kidney is not at first distinguishable by special feature, as regards either the blood or urine, from that which is met with in conjunct with tubular nephritis. Your diagnosis must b

termined by the history of the case, and by general symptoms. You must keep in view that the phlegmonoid disease is of gradual formation, does not come on rapidly, is not generally traceable to any special exposure to cold or wet, and, as a rule, is never accompanied by dropsy. The phlegmonoid inflammation generally attacks one kidney only; and the pain, when it is a prominent symptom, is referred to one side, and serves to point out the seat of irritation. This is also further indicated by the presence of some degree of fulness of that region, with, perhaps, tenderness on deep pressure, especially when the loin is pressed from behind forward. When the inflammation has fairly passed into suppuration, the hæmaturia will cease, and the blood will be replaced by pus: at first you find that the urine presents, instead of its usual clearness, an opaque appearance from the moment it is voided, the opacity being caused by pus-cells diffused in vast numbers through the urine; but, ere long, the pus accumulates in larger quantity, and falls as a heavy sediment to the bottom of the vessel, and may be easily recognised by the usual tests. The presence of pus in the urine following hæmaturia, with more or less completely the train of symptoms I have described, would render the diagnosis quite certain.

The fever which accompanies this form of inflammation is allied to intermittent or remittent fever,

and simulates those of marsh origin very exactly. After this stage, a new feature sometimes occurs. A tumour is found in the lumbar region, extending upwards into the hypochondrium, and to a considerable extent downwards, sometimes almost to the iliac fossa. The tumour may be felt, and is often very defined, both through the abdominal parietes and from behind. On the left side, it may so closely resemble the spleen, as to lead to its being mistaken for that organ. Indeed, it is sometimes a question exceedingly difficult of solution to determine whether a large tumour in the left hypochondrium be spleen or kidney. The renal tumour extends lower down and not quite so high up as the splenic. The anterior edge of the enlarged spleen is generally very defined and readily felt, and you may often insinuate your finger beneath it; it is likewise distinguished by the characteristic notch or notches. When the tumour is splenic, the percussion of the posterior part of the left lateral region of the chest is quite dull for some way up, often as high as the fifth or even the fourth rib; signs of pleuritic fluid or of condensed lung being wanting. An enlarged kidney does not rise so high into the chest; it is more free to enlarge downwards. The reasons of these differences are to be found in the normal anatomy of the two organs. The spleen lies upon the inferior ribs, and is tied to the stomach and to the spine by the gastro-splenic omentum; it is lodged quite

up in the concavity of the diaphragm, and its first increase of size would be in the upward direction. The kidney is situated lower down; it is kept *in sitû* only by loose areolar tissue and blood-vessels, and its highest point is lower down than the spleen. It needs considerable enlargement to reach the concave surface of the diaphragm.

It rarely falls to the lot of the practitioner to watch a case of this kind through all its stages from the beginning; and we are forced to discover the clinical history of the malady, by putting together the scraps of various cases which come before us at different periods of the disease.

Case VI.—A case which I witnessed in the spring of 1855, along with Mr. Wakefield, illustrates the concurrence of hæmaturia with phlegmonoid inflammation. The patient was a very stout, full man, of plethoric and gouty habit, sixty years of age. He had had, on previous occasions, attacks of pain in the kidney and hæmaturia, and had voided calculous matter. The first symptom of his last illness was hæmaturia, with some dull pain, referred to the region of the right kidney. The hæmaturia was considerable, and under it, on the third day, he became quite prostrate, his face and tongue assumed a typhoid aspect, and he was slightly delirious. On the fourth day, in consequence of the delirium and his weakness, it was determined to administer stimulants freely. He now began to

have a distinct and severe rigor every evening. The hæmaturia, it had hitherto been supposed, was due to the displacement of a renal calculus, as on former occasions. But the occurrence of these febrile symptoms with the quotidian rigor, for three days in succession, led us to expect some inflammatory affection, with suppuration, or tendency thereto. One evening he succeeded in getting out of bed, despite of the remonstrances and opposition of his attendants; and he had no sooner got on his feet than he fell in a faint, from which he could not be recovered.

The post-mortem inspection showed phlegmonous inflammation of the areolar and adipose tissue around the right kidney, and a circumscribed abscess, large enough to contain a walnut; pus was diffused through other parts of the areolar tissue of the kidney. The organ itself was very large and much congested, but showed no sign of a suppurative process; it doubtless participated in the inflammation which seemed to have begun in the surrounding areolar tissue, but it had not advanced beyond the earliest stage of active hyperæmia. The tubes contained more epithelium than in health.

I have said enough to indicate how infla matory irritation of the kidney will give rise hæmaturia.

By far the most common cause of bloody uri is the disturbance of a calculus formed and lod

in the kidney. So long as the calculus remains in the position in which it was formed, there is often no symptom to indicate its existence in the organ; but immediately it has undergone any displacement, it excites irritation of the gland, congestion, and bloody urine; or its displacement may have caused the rupture of a greater or less number of blood-vessels, from the torn mouths of which blood will escape with more or less freedom. There is no direct proportion between the amount of hæmorrhage and the size and number of the calculi. In other words, a small calculus may excite a profuse hæmorrhage, while a large one, or a great number of small ones, may escape with only a very trifling hæmorrhage. I have as many as forty oxalate of lime calculi, which were discharged at one effort, so to speak, from the kidney of a gentleman, and scarcely an ounce of blood was lost. On a previous occasion, the same patient had expelled five calculi, similar in size and composition, and yet there was considerable hæmorrhage for a period of three or four days.

The position which the calculus occupies in the kidney has, no doubt, much to do with the amount of the bleeding. If the stone be lodged near one of the infundibula, it may make its way into it without any material injury to blood-vessels, however large or numerous the calculi; but if the stone be lodged in one of the cones, or in the cortical substance, its displacement must neces-

sarily lacerate the parenchyma, and cause the rupture of a great number of capillary vessels. One would expect the greatest amount of hæmorrhage when one or more Malpighian bodies are involved in the laceration.

The diagnosis of hæmaturia caused by a calculus in the kidney is not so simple as it would *à priori* appear. Although the symptoms of stone in the kidney are often sufficiently definite, there are other morbid states affecting that organ or its annexed structures which are capable of generating symptoms of a like kind; and it is not often easy to distinguish between them.

A slow hæmorrhage from the kidney, when the oozing of blood is sufficiently gradual to allow of the moulding of clots in the infundibula, may give rise to the symptoms of the passage of a calculus, when one or more of these clots escape into the ureter, and pass down that tube into the kidney.

Case VII.—A remarkable instance of this was witnessed by me in a case of cancerous enlargement of the kidney, in a gentleman sixty-two o three years of age. The tumour, which could distinctly felt through the abdominal parieties the right hypogastric region, had probably exist for some time without the patient's knowledg Although of great size, it caused no uneasiness inconvenience whatever, and, indeed, was not covered until an attack of hæmaturia, unattende

pain, rendered an examination of the abdomen necessary. Soon afterwards clots began to pass, and their passage down the ureter was accompanied by pain in the course of this tube; and on one occasion, a clot seemed to be arrested so distinctly at the vesical extremity of the ureter, creating great irritability of the bladder, as to excite for a time the suspicion that a calculus had become impacted at the end of the ureter. These and other symptoms were, however, soon explained by the progress of the case; and all the irritation of ureter and bladder was found to arise from the renal hæmorrhage, and from the passage of clots of blood through the ureter, and their accumulation in the bladder exciting inflammation of the mucous membrane of this organ, with copious purulent secretion. As soon as the hæmorrhage had ceased, and all remnant of blood-clots had disappeared, the symptoms referable to the bladder and kidney ceased also, notwithstanding that the cancerous tumour had steadily increased in size. On a recurrence of the hæmorrhage, the same symptoms reappeared, ceasing with the discontinuance of the bleeding; and although the patient survived for some months the last attack of hæmorrhage, neither these symptoms, nor, indeed, any symptom referable to either kidney or bladder, again recurred. He passed urine freely and in natural quantity; nor was it possible to discover in that fluid, by repeated physical and chemical examinations, any departure from the

healthy state. At no period of the case, indeed, did the investigation of the urine afford any assistance to the diagnosis. The patient died of the effects of an extensive effusion of fluid into the left pleural cavity; and on inspecting the body, it was found that, in addition to immense cancerous deposits in the right kidney, giving this organ a size three times its natural one, there were masses of cancer in both pleuræ and in the mediastinum.

An inflammatory affection of one of the ureters may excite symptoms very much like those of the passage of a renal calculus. In such cases the urine contains more or less of pus, with or without blood; the purulent matter has its source in the inflamed mucous membrane of the ureter and bladder, or it comes from the pelvis or infundibula of the kidney, or from a renal abscess.

The severity of the symptoms in the following case seems more to be attributable to the complication of an inflamed and ulcerated ureter, than to the renal disease alone.

Case VIII.—W. Denny, æt. 34, a butler, admitted August 9th, 1850. This man's illness began with a sudden seizure of severe lancinating pain, referred to the right loin, and accompanie by constant and intractable vomiting. Two d previous to the attack, he had observed that urine was of a dark colour, and that upon sta ing a thick sediment formed, which he descril

as half solid, and resembling dark-coloured *blanc-mange*. This was probably pus, derived from the kidney or ureter, or both.

Very active treatment, such as bleeding, fomentations, and various internal medicines, affording no relief to his pain or vomiting, he was removed to a large metropolitan hospital, where the bladder was sounded by an eminent surgeon and pronounced free from calculus. He remained in the hospital ten weeks, suffering from paroxysms of pain and vomiting, his urine being always thick and very offensive. His symptoms becoming mitigated, he left the hospital for the country, where they soon returned, and he was compelled to seek admission again. After a month's treatment, he was again discharged and went to the sea-side, when the pain and vomiting gradually diminished, the right loin remaining very tender to the touch. He continued free from any paroxysm for four years, when he found the urine become thick and offensive in smell, the pain in the loin increased very much, and he suffered from vomiting. He described the urine as being of a dark chocolate colour, thick and offensive, and depositing a reddish gravel. He now suffered from repeated paroxysms of pain, with rigors, and was forced to seek relief from one hospital to another. By one able physician he was told that he had a mulberry calculus in his right kidney. The pain was so severe at times,

that he was made to inhale chloroform for its relief. After a further sojourn in the hospital for some weeks, he again went into the country, whence he returned to become an inmate of King's College Hospital with a renewal of precisely similar symptoms.

Whilst under our observation here, his sufferings appeared to come on in frequent paroxysms of most acute pain, referred to the right loin, and extending down the ureter, with violent vomiting and retraction of the testicle. The attacks seemed quite to indicate the attempted passage of a foreign body from the kidney along the ureter. But no calculus could be detected, nor was ever observed at any period of his illness to pass away in the urine, and the periods of total remission of pain, which he used to enjoy often for so long a time as three or four weeks, and since his admission into hospital for as long as a week, rendered it improbable that a calculus had become lodged in the bladder.

The examination of the urine showed that it contained pus in variable quantity, increasing with the paroxysms and diminishing as they subsided; but no calculous matter could be discovered in the urine, or in the deposit from it, save microscopic crystals of lithic acid, and some of oxalate of lime. There were no indications of blood in the urine.

Under the frequent recurrence of the attacks

of pain and vomiting, with rigors, and the weakening influence of the purulent discharge, this patient soon exhibited signs of decided failure of strength. His debility was much increased by a severe attack of diarrhœa, and he gradually sunk, and died on the 17th of October, upwards of two months from his admission.

At the post-mortem examination, the most careful search was made for a calculus; but no sign of one could be discovered A small abscess had destroyed part of the right kidney, but that organ was not enlarged nor diseased in any other part than around the abscess. The ureter was thickened throughout the greatest part of its course, and deposits of lymph adhered to its mucous membrane. The left kidney and ureter were healthy, and the bladder was likewise free from disease.

The severe symptoms in this case could not have been due to a calculus, for no such body was found. If it had ever existed, it must have been evacuated before death; and then there would have been some marked modification in the symptoms; nor is it likely that a calculus of such a size and nature as to excite symptoms so severe as this patient laboured under would have been evacuated without attracting his attention. I am inclined to think that the severity of the symptoms was due to the inflammatory affection of the ureter; and in this view I am confirmed by a case in which symptoms of precisely the same

kind occurred in connexion with a similar inflammatory condition of the ureter, proceeding from the bladder to the kidney, and extending to the pelvis of the latter organ, but not involving its substance.

The affection called *pyelitis* by Rayer is chiefly known as caused by the irritation of a renal calculus, and its clinical history has not been described saving as inflammation of the infundibula and pelvis of the kidney. As such cases are almost invariably associated with calculus, it is impossible to say how far the symptoms are due to the foreign body, and how far to the inflammation of the mucous membrane.

I cannot doubt that an inflammatory state of the ureter, either of its mucous membrane or of its muscular coat, or of both, occurs, generally in connexion with gout, but sometimes independently of it, without any evidence of calculus. In one case of this kind, the patient being a man of highly gouty diathesis, there were intense pain and irritation along the course of the ureter; but there was no retraction of the testicle, and the urine, while it presented no sign of the presence of blood, was slightly opaque from diffused purulent matter. This patient also suffered from most severe and prolonged hiccup, which, after the failure of most of the ordinary sedatives, was relieved by very free purging under the influence of a few large doses of calomel. In another case,

the symptoms, although very definite, were less severe. They were, pain in the course of the right ureter, without retraction of the testicle, and a muddy state of urine from diffused pus. This state of urine gradually disappeared as the local pain diminished. There was no blood. The early appearance of tolerably pure blood in a fresh state, accompanied with retraction of the testicle and pain distinctly localized, will generally indicate the presence of a calculus, and the diagnosis may be regarded as certain if the patient has passed a stone or pieces of gravel on any previous occasion. But it is well known that calculi may pass even in numbers without any material discharge of blood.

I have said enough to show you that you must not be hasty in attributing the hæmaturia which is associated with pain referred to the region of the kidney and the course of the ureter, to the presence of a renal calculus. That it is so in a large proportion of cases, there can be no doubt; but you must bear in recollection that there are at least five affections which may give rise to most of the symptoms: these are—1, phlegmonoid inflammation of the kidney; 2, pyelitis, involving more or less of the ureter; 3, gouty irritation or inflammation of the ureter; 4, malignant disease of the kidney; 5, inflammation of the ureter, whether spreading to the bladder or communicated from that organ. Hæmaturia is

sometimes found in hospital practice to be due to an impoverished state of blood, from insufficient and inappropriate food. In the genuine scurvy, hæmaturia is of rare occurrence, so far as I know: it is more prone to happen in those states of blood which produce purpura, or which tend to give rise to œdematous or dropsical swellings; blood impoverished in a state of constitution tainted with struma, or with some other *materies morbi,* as that of rheumatism, gout, or cancer.

The following case illustrates this form of hæmaturia coming on in the depressed state of system which accompanies erysipelas of the fauces, and also shows how readily it gets well when the depressing influence of that poison has been removed.

Case IX.—A man, æt. 60, was admitted into King's College Hospital, suffering under well-marked symptoms of erysipelas of the fauces. The case was well noted by Mr. Liveing (vol. xxxviii. p. 77). His illness began with shivering, fever, loss of appetite, sore throat, and some difficulty of swallowing. This last symptom increased so rapidly, that in three days deglutition was almost impossible, although the fauces were open and unobstructed. The urine was found to contain blood in considerable quantity; blood-corpuscles in abundance were seen under the microscope, and numerous tube-casts, composed of blood-cor-

puscles, which had doubtless escaped from the rupture of one or more of the minute vessels which compose the Malpighian tufts.

He was treated by the free administration of quinine and beef-tea by the rectum, wine, and the local application of nitrate of silver to the throat. No attention was paid to the hæmaturia. Four days after this treatment had been commenced, the fauces were restored to their natural condition, and the blood had disappeared from the urine.*

I must not conclude this lecture without referring to the hæmaturia which has its source in the bladder. This occurs under forms very similar to those of renal hæmaturia.

For example, you will find an inflammatory condition of the mucous membrane of the bladder a very frequent cause of this bloody discharge. This cystitis may be due to a constitutional cause, very often *gout*, or to a mechanical one, such as the presence of a calculus in the bladder, or the influence of some peculiar irritant, as cantharides or turpentine.

A second cause of cystic hæmaturia is the re-

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* See on this subject the *Medical Times* of June 5, 1852, and July 15, 1854. This affection of the throat, which is very apt to be fatal, is not, I fear, generally known and appreciated.

tention of the urine in the bladder, and the generation of carbonate of ammonia by the decomposition of the urea, which is its principal organic constituent. Such retention may arise from a stricture of the urethra, which does not allow the bladder to be ever completely evacuated by the natural expulsive effort. But it more frequently comes under the observation of the physician as the result of paralysis of the bladder, due in the great majority of instances to disease of the spinal cord, which likewise causes more or less of paraplegia.

It may be laid down as a general rule, that in this form of cystic hæmaturia the urine contains more or less of muco-purulent matter, assuming, when this secretion is alkaline, the peculiar viscid character which has long been known among practical writers as "*ropy mucus.*" This name, although you will find it adopted by high authorities, is nevertheless an incorrect one. The substance in question is not *mucus;* it is *pus,* altered by the presence of an alkali—altered as you often see it when in the wards we test for its presence by liquor potassæ. Under the influence of this agent, or of ammonia, the liquid pus becomes viscid, stringy, or ropy, just like the white or albumen of an unboiled egg. The reaction is probably due to the presence of oily matter in the pus, which uniting with the alkali, forms a soap.

A third form of cystic hæmaturia is that which depends upon the presence of a fungoid growth from the mucous membrane of the organ. It is remarkable how insidiously this affection will come on. A fungus of considerable size may exist in the bladder, for a long time, without exciting any symptom calculated to arrest the attention of the patient or of his medical adviser. The presence of blood in the urine is generally the first indication that all is not right; and, in some instances, there is no other symptom than the frequent recurrence of the hæmorrhage, occasionally to a fearful extent, but always to such a degree as, sooner or later, to blanch the patient and exhaust his strength.

In other cases the fungus will excite inflammation of the mucous membrane of the bladder, and render that organ irritable and impatient of its contents, and giving rise to frequent micturition, and to the increased secretion of mucus, and afterwards of pus. In other instances, again, the expulsive power of the muscular coat of the bladder is materially impaired; and although the bladder becomes irritable, and micturition very frequent, it seldom succeeds in completely emptying itself: small quantities of urine remain, therefore, after each effort of micturition, which, undergoing decomposition, generate carbonate of ammonia, and add to the existing irritation and inflammation.

Such is the history of that formidable malady fungus of the bladder, which I may illustrate to you by the following cases:—

Case X.—Anne Tapner (vol. xlii. p. 149), æt. 67, a widow, mother of six children. Had not suffered from any serious illness till the occurrence of the symptoms for which she sought admission into the hospital in July, 1854. I need not enter into the full detail of her previous history as obtained by my clinical clerk, Mr. Straker, who took the notes of the case, excepting to state that no evidence could be obtained of any hereditary disease in her family. The catamenia ceased at fifty.

Seven years prior to her admission she passed blood in her urine, but not to such an extent as to interfere with her ordinary avocations. Since that time she has been subject to a frequent recurrence of the bloody discharge, with intervals of three or four months of perfect freedom from blood; but the urine has been apt to emit an offensive smell, and has rarely been free from sediment. At Christmas, 1853, she had pain in the loins, which lasted for two or three weeks, and then ceased; during that time there was a copious jelly-like sediment from her urine.

The illness for which she entered the hospital began, three weeks before her admission, with severe pain before, during, and after micturition.

The urine was bloody, and continued constantly so during a fortnight immediately preceding her admission. The pain in the bladder has been constant during this time, but she was free from pain in the loins. She has been obliged to pass her water every quarter of an hour, otherwise it "flew from her" involuntarily. The whole quantity passed was not more than natural. Sometimes the urine would stop suddenly in its flow, as if something blocked up the passage.

The urine for the first week of her sojourn in the hospital was of a deep red colour, precisely that of blood; it contained several clots, each of which was as large as a nutmeg; it had a very offensive ammoniacal odour, and was highly alkaline.

The patient's complexion was very anæmic; her countenance haggard and expressive of suffering; the tongue and mucous membrane of the mouth were likewise pale, and indicative of a general anæmic condition.

I thought it expedient to have the bladder searched for a calculus. This was very carefully done, but no evidence of the presence of a stone could be obtained. The interior of the bladder felt rough, and nodulated to the extremity of the sound.

The urine deposited a large quantity of viscid matter, which adhered to the sides of the vessel (the so-called ropy mucus), and was deeply stained

with the colouring matter of the blood. This was carefully examined with the microscope, and found to contain abundance of pus and blood-corpuscles, but no trace could be discovered of any peculiar cell indicative of cancerous disease.

The lumbar regions were carefully examined, but no evidence of enlargement of the kidneys could be obtained.

From the absence of all symptoms distinctly referable to the kidneys, the escape of large round clots, and the extreme pain and irritation being referred to the bladder, it was concluded that the hæmorrhage was from that organ, the mucous membrane of which was likewise probably the seat of considerable inflammation, indicated by the large quantity of muco-purulent secretion which came away with the urine. And as no trace of stone could be found, looking to the age and cachectic condition of the patient, and the frequent attacks of hæmorrhage with varying intervals of cessation, it was inferred that the source of the hæmorrhage was the mucous membrane of the bladder, which was probably the seat of malignant disease.

Under the use of gallic acid, with occasional doses of acetate of lead and opium, the hæmorrhage subsided very much, and the vesical pain was somewhat relieved by the use of enemata of starch with laudanum: the patient, however, continued to sink rapidly, being worn out by

great pain and very frequent micturition. She died in nine days after her admission.

On opening the bladder, there was found growing, by a thick pedicle from the posterior wall and the inferior fundus of the bladder, a globular tumour, of the size of a green-gage plum. On section, the basement half of this tumour was found to consist of white medullary cancer; the apex, or free portion, was of a dark red colour, extremely vascular, and the whole surface well calculated to discharge the large quantity of blood which had been found in the urine.

The kidneys were pale and flabby, rather large, and seemed somewhat fatty; the ureters were healthy; the other organs were free from disease, but the whole body was remarkably anæmic.

It seems highly probable that this malignant tumour was of long date, and of very slow growth, extending over the whole period of seven years, during which the patient suffered more or less from vesical symptoms. I shall add another case, to show how a fungus may exist in the bladder for a considerable time without exciting any symptom to arrest the attention either of the patient or his medical attendant.

Case XI.—A gentleman, æt. 35, had spent some years in India, and afterwards in Germany,

living freely and following field sports pretty keenly. In December, 1852, he suffered greatly from pain in the stomach, and such irritability of that organ that it could scarcely be brought to retain any kind of food. Three weeks elapsed before he recovered this attack. He suffered from a second similar attack early in August, 1853, while at Homburg: from this he had scarcely recovered, when he had to encounter a third similar one at Schwalbach, whither he had removed. This lasted fully three weeks. He then returned to England, and early in October, owing to some indiscretion in diet, his symptoms returned with great severity, and he suffered much from pain after eating, and incessant vomiting. He became rapidly emaciated, and put on very much the aspect of a person labouring under malignant disease of the stomach. After an illness of six weeks, notwithstanding the most judicious treatment, no improvement took place. At this time I first saw him, at his uncle's house, in one of the midland counties. I found him emaciated to the last degree, and suffering from the most distressing irritability of the stomach and constipated bowels, but no indication of any disturbance of the urinary organs. The aspect of the patient was quite enough to create a strong suspicion of malignant disease; but, on a careful examination, no tumour or other evidence confirmatory of such suspicion could be obtained. By my advice, he was limited strictly

to small portions of arrow-root made with water; he was allowed to drink water in very small quantity; aperient medicine was prohibited, and morphia with creosote was given in small and repeated doses. From this time the sickness was completely controlled, but the bowels became very much confined. After ten days, some little difficulty was experienced in micturition; but this was found to be due to the impaction of a large quantity of fæces in the rectum, the bowels not having acted during that time. On the removal of these, the difficulty of micturition ceased, and he made a steady progress to recovery. In January, 1854, he called upon me perfectly recovered in every way, and he had grown fat. From this time to the beginning of March, he continued quite well at Brighton, with the exception of an occasional slight attack of asthma, to which he was subject. On the evening of the 7th of March, he dined with a friend in London on pea-soup, smelt, and a mutton cutlet, and went to the theatre afterwards. While at the theatre, he was seized with diarrhœa, followed by vomiting, and now all his old symptoms returned—pain after food of all kinds, excessive irritability of stomach, confined bowels, and rapid emaciation. In a fortnight, he had gone back to the state of nearly complete marasmus in which I had first found him. No new symptom arose to throw any additional light upon the nature of his malady. By dint of very

careful feeding with an almost exclusively farinaceous diet, and the frequent use of various sedatives, bismuth, creosote, morphia, and alkalies, his condition had begun to improve in about six weeks, when a new symptom showed itself—the bladder became irritable, and he was troubled with great frequency of micturition; and now blood began to appear in the urine in considerable quantity, giving a bright scarlet hue to the excreted fluid, and numerous clots were expelled. So decided a hæmorrhage coming on in his state of extreme emaciation and exhaustion, very quickly undermined his slight remaining vital power, and he died on the third day from the onset of the hæmorrhage.

The amount of lesion of the stomach, as revealed by post-mortem inspection in this remarkable case, was scarcely proportionate to the severity of the symptoms under which the patient laboured. Nevertheless, there were some very remarkable alterations in its mucous membrane, showing that it had been the seat of a morbid process during life, which must have occasioned considerable disturbance in the functions of the organ. It would be out of place here to enter upon any description of these, of which, thanks to the patient examination of Dr. Conway Evans, I have a very full account. Brunner's glands in the duodenum were much enlarged, as if that viscus had been also the seat of much irritation.

There was no disease of the kidneys; but the bladder was embedded in a mass of scirrhus, which occupied the space between it and the rectum, and was of such magnitude as nearly to fill the whole true pelvis. It seemed to be incorporated with and to have sprung from the wall of the bladder. A red fungoid mass projected into its cavity, and from this oozed the blood, the loss of which had, no doubt, materially hastened the patient's death. The morbid mass was found, by microscopic examination, to consist of a fibrous network, containing in its meshes a multitude of nucleated cells, of various shapes and sizes.

It was a curious point in this case, that until the occurrence of the hæmaturia, no symptoms of disturbance of the functions of the bladder should have presented themselves.

It is one more instance, in addition to many others which are recorded, to show how little an adventitious mass will interfere with the functions of the organs among which it is placed when its growth is very slow and gradual. Such, probably, was the case here, judging from the extent of the tumour. It seems not improbable, likewise, that the existence of a growth like this in the pelvis, by affording some obstruction to the passage of the contents of the bowels, and perhaps also by nervous sympathy, may have tended to keep up the excessive irritability of the stomach.

There is yet one other form of hæmaturia to which I shall briefly allude. It is endemic in the Isle of France, and so common there, as I am informed, that few of the male population escape it. In the single case which I have had the opportunity of fully investigating, I came to the conclusion that the hæmorrhage, which was always very small in quantity, was derived from the bladder.

Case XII.—The young man (p. p. 1847), who was the subject of the case to which I have referred, enjoyed excellent health, and, with the exception of frequent micturition, often to a very troublesome extent, and the occasional discharge of blood, all the functions were quite natural. He had resided for five years in the Mauritius shortly before he came under my observation, at which time he was about twenty-five years of age. The blood was always very small in quantity, never so much as to discolour the great bulk of the urine; it came with the last portion only, quite at the end of micturition, discolouring slightly, and a few drops of apparently pure blood escaping at the last. Sometimes small clots were discharged, without any definite shape. After standing, the urine would deposit a sediment of a whitish or reddish mucus. This, when subjected to the miscroscope, was found to contain bladder epithelium, very numerous octohedral

crystals of oxalate of lime, with a few cells, which presented all the microscopic characters and reactions of those of pus and blood-corpuscles. There was no appearance of casts of tubes, or of renal epithelium. The source of the hæmorrhage was doubtless the bladder, and the disease seemed to be essentially a catarrh of that organ with occasional hæmorrhage. Could the great abundance of oxalate of lime crystals in the urine have acted as an irritant to the bladder, exciting the mucous secretion as well as the hæmorrhage? Under the long-continued use of nitric acid and gallic acid, the hæmorrhagic tendency diminished, and the patient improved very much.

Let me conclude this already too long lecture by a glance at the means to be used in the treatment of hæmaturia.

It is obviously of the first importance to distinguish between the inflammatory and the non-inflammatory forms of hæmaturia, whether vesical or renal; and not less so to determine the immediate exciting cause of the inflammation, as, especially in vesical hæmorrhage, whether that cause be purely mechanical, and the inflammation kept up by the presence of a calculus.

If such a cause exist in the kidney, and excite renal hæmorrhage, the best single remedy for the discharge of blood is rest in the horizontal posture, the patient being advised to lie on the

side opposite that whence the blood flows, if you are able to determine with precision which is the affected kidney. To this may be added free dilution, the use of some vegetable astringent, dry cupping over the loins, or the abstraction of a little blood if there be reason to fear much congestion, or counter-irritation by mustard. Other treatment must be suggested by the peculiar diathesis of the patient; and it must be such as will promote the solution of existing calculi, or hinder the formation of fresh ones. And it is important also to promote the discharge of these offending substances. I can speak most favourably, from the experience of several cases, of the influence of the long-continued use of a mild non-irritating diuretic, such as Vichy water, in promoting the expulsion of renal calculi, even of those composed of oxalate of lime, which it could not influence chemically.

With reference to that form of renal hæmaturia which accompanies inflammatory dropsy, or that dependent on tubular nephritis, I need not do more than refer to the cases with which I have endeavoured to illustrate the previous lecture. The remedies to be chiefly relied on in the early periods of this affection are purging and sweating; but in the use of these, as of other reducing remedies, I cannot too often nor too strongly warn you to be cautious not to carry them so far as to induce that impoverished state of

blood which is in itself favourable to hæmorrhage.

The vesical inflammation which gives rise to hæmorrhage, and which is not dependent on the presence of a calculus, is best subdued by soothing means, warm fomentations, hip-baths, opiates chiefly as enemata, hyoscyamus, and in some instances by the cautious application of leeches to the perinæum, or above the pubes. But from these last means you must not expect much; they are on the whole better avoided, and ought not to be employed at all if there be any reason to suspect that gout has any share in exciting or promoting the inflammation.

The urine in these cases should be kept in a moderately acid state. It seems quite certain that alkaline urine is an irritant to the bladder, more especially if its alkalinity be due to the decomposition of urea within the organ. The best remedies for this purpose are the nitric acid and the benzoic acid. Either may be used, in combination with uva ursi or the Pareira brava, or may be often much better given in distilled water, and may be carried with great benefit to a very large dose. The dilute nitric acid, in doses of half a drachm, in two ounces of the strong decoction of Pareira brava, three or four times a day, is an invaluable remedy in cystic inflammation.

It is after the inflammatory state has been subdued that a cachectic state is apt to supervene,

which favours the continuance of the hæmorrhage. And this condition will be inevitably augmented, if the so-called antiphlogistic remedies have been previously used too zealously, and if the general nutrition of the patient has not been sufficiently upheld.

In this stage we must seek the aid of styptics; and our present knowledge affords us nothing better than the tannic and gallic acids, or the astringent vegetable infusions, decoctions, or tinctures which contain them. Either the tannic or the gallic acid may be given in very large doses; indeed, I know no limit to their use, but that which the stomach and taste of the patient will readily oppose. The former is preferable to the latter, as being more soluble; but as, in its passage through the system it is changed into gallic acid, according to Wöhler and Frerichs, and probably would act upon the seat of hæmorrhage as that substance, the latter is the preferable drug to be administered internally. As Dr. Garrod suggests, a dose of gallic acid ought to act more powerfully as a remote astringent, than an equal weight of tannic acid. In all cases of hæmorrhage, whether of hæmoptysis, hæmatemesis, hæmaturia, or any other form dependent on hæmorrhagic tendency, I have used gallic acid with the greatest advantage, and I am therefore disposed to regard it as the best styptic we possess.

Circumstances might render it advisable to

inject an astringent solution into the bladder. In such a case, it would be better to use the tannic rather than the gallic acid, inasmuch as the former has the more energetic chemical action on albumen, gelatine, and fibrine.*

* Pereira, *Mat. Med.*, vol. ii. part 1, p. 1231.

LECTURE III.

On those diseases of the kidney with which are associated an albuminous condition of the urine and dropsy.

I WISH, gentlemen, to bring before you, to-day, and in a subsequent lecture, a connected view of the principal points in the clinical history of those forms of diseased kidney with which are associated albuminous urine and dropsy. Both the albuminous urine and the dropsy in these cases must be regarded as undoubtedly symptoms of great importance; but the latter is of the greatest moment in the eyes of the patient.

With reference to the connexion of dropsy with an albuminous condition of the urine, you will find that the cases naturally divide themselves into two great classes. Of these, the first includes those cases which are distinctly and decidedly dropsical—in which the dropsy is, at once, the most marked and the most urgent symptom, which both patient and physician watch from day to day, each alike anxious for its reduction and entire disappearance; the second consists of those cases in which the dropsy attracts but little notice, is very variable in amount, being in some cases considerable, but never excessive, while in others it may be very

slight indeed, or even altogether absent; and in some instances the disease may go on for a long time, and, possibly, destroy the patient's life without giving rise to the least œdema. All the cases of both these classes exhibit the common feature of a more or less albuminous condition of the urine; there being an extensive range as regards the quantity of the albuminous element, from those cases in which the urine on boiling becomes almost as solid as the serum of the blood when similarly treated, down to those in which only the very slightest precipitate is attainable by heat, nitric acid, or other tests. Occasionally, and I now allude more particularly to some of those instances of renal disease in which the kidneys are apt to become shrunken and contracted—a pathological condition which I described many years ago under the name of *gouty kidney*—notwithstanding the existence of most serious morbid states of the kidneys, the urine may be perfectly free from albumen. I should perhaps rather say, that it now and then happens that, after there has been distinct evidence of renal disease existing for some time, all traces of albumen may disappear from the urine. This is especially the case in the intervals between the paroxysms of the gouty attack in some of those instances of gout in which the kidneys after a time become damaged, and their secreting structure more or less destroyed. And in some of these cases, when you

examine the urine, you may occasionally fail to detect the slightest trace of albumen, although at the time of your examination the kidneys may be in a decidedly diseased condition; but even in such instances, if you carefully test this secretion from day to day, you will generally find that after a time, and particularly just before or during the next attack of gout which your patient gets, albumen will make its appearance in the urine in greater or less quantity.

I must ask you to look at all these cases in a *clinical* point of view with reference to the general symptoms which they exhibit; in other words, with reference to the nature and amount of disturbance which the disease excites in the functions of the body. The condition of the circulation, especially of that in the capillary system; the position and amount of the dropsy, if it exist, and the period at which it came on; the state of the blood; the colour of the skin and the complexion; the quantity and quality of the urine, and the nature of its sediment; the condition of other organs, especially the heart, the liver, and the spleen;—these are the main points to which your attention should be directed. And from the results of such an investigation you will be generally able to form a sound estimate of the actual state of the kidneys. Add to this a careful and repeated examination of the urinary sediments under the microscope, and you will obtain data

sufficient to enable you often to make your diagnosis quite certain. Let me, however, caution you against relying too much on the information derivable from this last source, and against your beginning your investigations of the case by examining the sedimentary deposits from the urine. I have traced many mistakes in diagnosis and in practice to a too exclusive reliance on the physical or even the chemical examination of the urine: the mind is apt to acquire a bias from too eager attention to a comparatively easier and simpler investigation, which leads it to overlook or to misinterpret other important phenomena in the case. And I may add, that while it is clearly your duty not to neglect any means of observation and investigation, it is desirable that you should be as little as possible dependent on means which are not always at hand, and which it does not fall to the lot of every eye and hand to use with readiness and skill.

In the first of the two classes to which I have alluded—namely, that which comprises those cases which are distinctly dropsical, and in which the dropsy forms an early and an urgent symptom—the disease is, generally speaking, *acute;* it runs a rapid course in its early stages, and the dropsy becomes very quickly developed. Of this great class there are two varieties, viz., 1st, the *acute dropsy* specially so called, and which generally arises from exposure to wet and cold; and,

2nd, that form of dropsy which is apt to follow scarlet fever, and to which I shall allude more particularly in a subsequent lecture. You have had the opportunity of seeing many cases of this affection in the hospital during the past winter months.*

The acute dropsy is very similar in its characters to that which follows scarlet fever, and the peculiarities of the urine in both these diseases are very much alike. In both instances the dropsy comes on rapidly, and its principal features bear a close resemblance to each other in the two affections; but there is this difference between them, that in the dropsy following scarlet fever the colouring-matter of the blood is remarkably diminished in quantity, and perhaps also altered in quality, while this does not necessarily nor so decidedly obtain in the case of the acute dropsy properly so called, although sooner or later it suffers changes both in quality and quantity.

The history of an ordinary case of acute dropsy is this:—A man is much exposed to wet and cold, or to cold alone—perhaps he has had a thorough wetting, or it may be he sleeps in the open air all night: a few days afterwards, it may be as many as twenty days, he finds that his kidneys do not act properly; perhaps his urine contains blood,

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* For cases of acute dropsy, see Lects. I. II. and VIII.; and of dropsy after scarlet fever, see Lects. VI. and VII.

which he distinctly recognises as such; or, as more frequently happens, he passes blood in his urine, but is unacquainted with the circumstance, though any one at all skilled in these matters would readily detect it. Then his eyelids and face become puffy and swollen; after a little time, the limbs, scrotum, and body generally also become œdematous; and often there is more or less dropsical effusion into the peritoneal cavity. This is the most frequent order in which the dropsy comes on; but you will meet with many exceptions to it, as it sometimes begins in the legs and the belly, and goes upwards.

The second class of cases, viz., that in which dropsy is not a prominent feature (though in some of these it, now and then, happens that the dropsy may, in the more advanced stages of the disease, become very urgent and distressing), admits of being divided for clinical purposes into three varieties, according to the quantity of urine daily excreted, together with its density and the amount of albumen which it contains. These three varieties are as follows:—

1st. In some of the cases of this class, the urine is moderate in quantity, or less copious than it should be, of a high specific gravity, ranging between 1015 and 1030, sometimes even as high as 1035, rarely so low as 1010, and so highly albuminous as to become almost solid when

boiled; or at least containing a very considerable quantity of albumen.

2nd. In the second variety, the amount of urine passed daily is moderate, but it has a tendency to have a lower density than healthy urine —varying, perhaps, from 1005 to 1015—and it contains a moderate quantity of albumen.

3rd. In the third variety of this class, the urine is generally very abundant, clear and pale, of low density—rarely above 1010, and generally even lower than this—and containing only a small quantity of albumen, which, upon the application of heat, forms flocculent particles, at first diffused through the fluid, but which soon sink to the bottom of the test-tube, forming a flocculent or granular precipitate.

In some of the forms of this second class, the dropsy is considerable; in others, this symptom is entirely, or almost entirely, absent; but in all those instances in which there is dropsy at all, this condition is more or less *chronic*, and it is this which constitutes the essential difference between these cases and those of the first class, which are decidedly *acute* in their nature.

There is yet another condition, which may be regarded as somewhat exceptional, although I have no doubt it occurs far more frequently than is generally supposed. A person may have been passing a considerable quantity of urine containing a slight amount of albumen, perhaps only the

merest trace of this substance, without dropsy, and with few or no symptoms of ill health; in short, he may have been labouring under disease of the kidney without being aware that anything was wrong, when he becomes exposed to cold or gets a wetting: soon afterwards a considerable amount of general dropsy rapidly supervenes, the quantity of urine secreted in twenty-four hours undergoing a material diminution, but the albumen acquiring a decided increase. The patient now comes into a hospital, or is subjected to proper medical treatment. He is kept in bed, has a few hot-air baths, a little purging, and some non-irritating diuretic, and the dropsy subsides; and in the course of ten days or a fortnight, or perhaps a little longer, he leaves the hospital quite free from dropsy, but his urine still containing a small quantity of albumen. In the great majority of these cases, however, the dropsy is of gradual origin and slow development; but it may, of course, go on until it becomes extreme.

The following appears to have been an example of an acute affection supervening upon chronic renal disease, probably fatty disease of the kidney, of the existence of which the patient seemed ignorant.

Case XIII.—William Higgins, æt. 22, was admitted November 16th, 1848 (vol. xxvi. a). He was a railway porter, lived chiefly in the country, declared himself a man of temperate

habits, and previously quite healthy. A fortnight before his admission, he got wet through, and was obliged to remain all night in his wet clothes, by which he was thoroughly chilled. Two or three days after this, his face swelled; and very soon after, the swelling extended to his upper and lower extremities, and to the abdomen; and from that time the dropsy steadily increased till he came into the hospital.

At the time of his admission, the dropsy was universal, and there was a considerable amount of fluid in the sac of the peritoneum. The eyelids were much swollen. The patient stated that he had been out of health for six months, and had frequent colds, to which of late he had been particularly liable; and for some time before he came to the hospital, he had passed very little water. For the week previous to his admission, he had suffered from dyspnœa, especially at night, and the quantity of urine excreted had been much diminished, and he had not perspired at all. There was no evidence of any morbid state of heart or lungs; nor in his previous history was there anything to explain the tendency to renal disease, excepting, perhaps, the exposure to vicissitudes of weather incident to his vocation.

The examination of the urine, which was frequently made during the first week of his sojourn in the hospital, gave the following result:—Quantity much below the natural amount, of acid

reaction, opaline, smoky, of specific gravity 1030—1035; a deposit is formed on standing, in which are detected by the microscope numerous transparent casts, renal epithelium, several casts containing oil, *fat-cells* in abundance, crystals of lithic acid, covered all over with sharp spines (lithate of soda?), a very few crystals of oxalate of lime, and some blood-corpuscles.

This patient was subjected to a diaphoretic treatment, by the action of hot-air baths; he was occasionally freely purged with compound powder of jalap, and the bitartrate of potass was exhibited in half-drachm doses, and he was kept constantly in bed. Under this treatment the dropsy quickly diminished; on the thirteenth day it had all disappeared, excepting some œdema of the thighs and ankles; the ascites was quite gone; the urine had increased considerably in quantity, had become slightly alkaline under the influence of the bitartrate, and its specific gravity was 1020. It was still highly albuminous. The urinary sediment contained blood-corpuscles, vesical epithelium, and fat-cells, which, however, had decreased considerably.

On the seventeenth day of treatment, the œdema was limited to the ankles, the urine (of specific gravity 1018) was smoky, contained albumen in diminished quantity, and the deposit consisted of blood-corpuscles, vesical epithelium, and a few large round fat-cells.

On the twenty-fourth day of treatment, the dropsy was quite gone; the albumen also was much diminished, heat and nitric acid rendering the urine simply opaque. A few casts containing oil, which had disappeared for nearly a fortnight, were now found again in the deposit, with fat-cells and blood-corpuscles.

On the twenty-seventh day, he was directed to take ten minims of the tincture of the sesquichloride of iron three times a day, and he was put upon a diet, which excluded as much as possible all food tending to produce fat, consisting of lean meat, a very small quantity of green vegetables, and water, with six ounces of bread. After two days he gave up the bread of his own accord, and was allowed fifteen ounces of meat in the day.

He did not remain more than five days in the hospital; probably not liking the diet. Under it the urine became paler in colour, of specific gravity 1025, slightly albuminous, with very little deposit, which contained some vesical epithelium and a very few fat-cells. There was no trace of dropsy.

In this condition he left the hospital: the primary chronic state of renal disease probably remained, but the acute condition had disappeared. It would have been interesting to have traced the subsequent history of this patient; but nothing has been heard of him since, a period of seven years.

From what I have said, you will at once perceive that the clinical features in these cases exhibit a good deal of variety. The dropsy varies in amount, and in the time and manner of its invasion; the urine differs very much in the several cases as to its quantity, its specific gravity, the amount of albumen it contains, and we shall see other varieties of symptoms as we go on. The question, then, naturally arises, to what are these variations of clinical features attributable? Is it possible that they may exist with only a single morbid condition of the kidneys? or are we not bound to infer that there are varieties of pathological states of these organs, just as there are varieties of trains of symptoms to which they give rise? That there are different varieties of morbid conditions of the kidneys, is a reasonable inference on *à priori* grounds; but after a careful consideration of all the facts of the case—of the variations in the clinical features, and of the different characters of the urine, which the cases themselves present—this conclusion cannot, I think, be doubted. And, as it seems to me, it is rendered quite certain by a reference to the morbid anatomy of the kidney, from which we learn that at least two essentially different conditions of this organ are associated with the clinical phenomena which I have described;—the one, a state in which the organs acquire a greater or less *increase* in size

and weight; and the other, in which they present the appearance of having shrunk more or less, and in which they experience a *diminution* in bulk and weight.

Of the first of these classes there are at least two forms: one, in which the pathological condition of the kidneys comes on very quickly, while the symptoms to which it gives rise are consequently *acute;* the other, in which the morbid process is very gradual, and the clinical features which it produces are essentially *chronic*.

Under acute enlargement of the kidney, I would class that state which is concurrent with the acute dropsy consequent on exposure to wet and cold, and also with the dropsy which follows scarlet fever. In both these diseases, the kidneys, when examined in the early stage, exhibit enlargement, though this is never very considerable; they are larger and plumper than healthy kidneys, and contain much more blood and epithelium (the uriniferous tubes being filled with epithelial cells, shed, perhaps, by a process somewhat analogous to that of cutaneous desquamation) than are found in these organs in a state of health. It is very difficult to distinguish the kidney of a patient who has died of acute dropsy from exposure to cold, from that of one in whom death has occurred in the dropsy which succeeds scarlet fever; but, generally speaking, the whiteness of the cortical portion of the organ, and the

extreme redness of the medullary cones, or, in other words, the distinction in colour between the cortical and pyramidal portions, although well-marked in the former malady, are much more so in the latter. Indeed, I would venture by these anatomical characters of the kidneys alone to pronounce upon the nature of the disease from which death had resulted.

Under the head of acute enlargement of the kidney, I may refer to that which occurs from phlegmonoid inflammation of the organ. This often reaches a great size, such that the kidney can be felt through the integuments. It is the more apt to occur when two or more lobules are the seat of inflammation. I shall not dwell on this, however, as it does not belong to the forms of disease which are specially associated with albuminous urine.*

Under chronic enlargement the kidney acquires a considerable increase of size, to the extent of being one-third or one-half as large again as the natural gland. There are two kinds: one being that which first attracted the notice of Dr. Bright, the large, mottled kidney, the peculiar features of which the discoveries of late years have shown to depend upon the deposition of fatty matter in the epithelium of the uriniferous tubes; the

* See Lect. II.

second, in which the enlargement is due to the deposit of a waxy-looking, fibrinous material, also in the uriniferous tubes, giving rise to what has been termed *waxy degeneration.* This condition is shared by the kidney in common with the liver and spleen, and all these glands generally acquire their increase of size simultaneously. The enlargement in both these cases is exceedingly chronic, but we have not as yet, I think, accumulated sufficient evidence to enable us to state how long it will take to make either a large fatty or a large waxy kidney. My own experience would incline me to think it a matter of many months, and often of some years, before the deposit takes place to so great an extent as to interfere materially with the normal functions of the organ. Indeed, a considerable amount of deposit may exist in the kidney without greatly interfering with its functions. Many of you, no doubt, will remember a patient who was in Fisk ward a few months ago, in whom there appeared to be good reasons for believing that extensive waxy degeneration of the kidneys, liver, and spleen existed (the two latter organs could be felt very much enlarged). This man enjoyed a tolerable share of health, and was, in fact, able, after some weeks, to leave the hospital; since which time, I regret to say, we have been unable to hear anything of him.

By and bye, when you come to deal with these

diseases in patients among the wealthier classes of society, who are enabled to surround themselves with all the means and appliances which are essential to their comfort, and which aid much in counteracting or retarding the effects of disease, you will be more struck with the prolonged duration of these maladies, and the wonderful manner in which a fair enjoyment of life may be attained under a condition which produces a daily drain of albumen in greater or less quantity. The patients who come before us here are very differently situated: of many we lose sight; but of many we see the end hastened by exposure to hardships and cold, and by intemperate habits. Let me in conclusion relate to you the details of a case illustrative of each of these forms of chronic enlargement of the kidney. And, first, of the fatty enlargement.

Case XIV.—Charles Tiedemann, æt. 55 (vol. xxxv. p. 124), a copperplate printer, and by the nature of his vocation subject to great vicissitudes of temperature. He denies being an intemperate man, but admits that his habit has been to drink about two quarts of porter and a quartern of gin daily. Has never had rheumatism or gout, nor have any of his family suffered from either of these complaints.

About three months before his admission, he observed that his breathing was not so good as usual, that he would puff on making any

exertion, and that he could not lie down in bed without some disturbance of his breathing. His feet and legs began to swell soon after this, and the swelling gradually extended to the thighs and scrotum; the urine became scanty in quantity. After six or seven weeks' medical treatment, the action of the kidneys was slightly improved as regards the quantity of urine excreted; but the other symptoms not yielding, he obtained admission into the hospital on the 28th of January, 1852.

When this man entered the hospital, he was found to be suffering from a general condition of anasarca, which chiefly affected the upper and lower extremities, and the integument of the trunk, especially that of the chest. The anasarca was considerable, and caused tension of the skin, which pitted on pressure. It varied in amount from one side to the other as the patient lay on the right or left side, and was always greatest in the most dependent parts. On palpation of the abdomen, it was evident, from the sense of fluctuation, that there was fluid in the peritoneum. The venous system in general, especially that of the neck, was full, and appeared to indicate some obstruction to the free return of the venous blood to the heart. The sounds of the heart were natural, but feeble. A slight rhonchus was audible in the anterior parts of both lungs; but there was no other indication of disturbance of these organs. There was no evidence of enlargement of the liver;

but the presence of ascites, although not in large quantity, favoured the suspicion that the circulation through that organ was not quite normal.

So large an amount of dropsy, and of such long duration, affecting the upper as well as the lower parts of the body, denoted *primâ facie* disease of the kidneys. This suspicion was confirmed by the absence of other causes likely to conduce to such a result, such as disease of the heart or of the liver; and it became a certainty after we had investigated the condition of the urine.

It was found that the quantity of this fluid excreted in twenty-four hours was much below the normal amount, being not more than a pint, of specific gravity 1017, acid, loaded with albumen, as shown both by heat and nitric acid. It had the smoky colour which characterizes urine into which the colouring matter of the blood has found its way in very small quantity, and when allowed to stand it deposited a light flocculent precipitate at the bottom of the glass.

At various times this precipitate was examined by the microscope, and found to contain blood-corpuscles, which were most numerous when the urine exhibited the smoky hue; numerous granular casts, some of which were of great delicacy, other casts containing oil-globules and oil-cells entangled in them; fat-cells, containing large oil-globules, lithate of ammonia, many small crystals of lithic acid, and some epithelium. In all the

examinations, the oil-globules and particles of fatty epithelium were present; but the blood-corpuscles were frequently absent, and latterly they were only very few in number when they did appear.

On one occasion, Dr. Beale made an examination of the urine, with a view to the separation of the fatty matter. Twenty-four pints of urine was the quantity operated on, and the amount of fatty matter separated was found to weigh ·47 of a grain. This, Dr. Beale states, consisted almost entirely of cholesterine, which was readily obtained in a crystalline form.

It would serve no good purpose to go through the daily reports on this case, which extended over a period from the 28th of January till the 25th of September. During the whole of this time the prominent symptom was the dropsy, which from time to time yielded to the influence of the various remedies adopted, but again increased as the power of the drug employed declined. He suffered likewise from many other trying symptoms. Of these, the first in importance was a variable amount of dyspnœa and cough, accompanied with a viscid expectoration. These were, probably, due to more or less irritation of the bronchial tubes, and a somewhat œdematous state of the lungs. Both lungs were affected equally. Like the dropsy, these symptoms yielded from time to time to the in-

fluence of remedies, and rose or fell with the fall or rise of the power of the remedy.

On the 1st of June, our patient was seized with a sharp pain in the right side, beneath and to the right of the mamma, and a friction sound was distinctly heard over the painful spot. Under local counter-irritation and increased diuresis, induced by infusion of digitalis and the spirit of nitric æther, this symptom disappeared in a few days. At various times he complained of muscular or neuralgic pains, sometimes referred to the joints, especially the knee-joint of the right side; and he often suffered from pain in the loins, in the region of the kidneys.

These pains, and the bronchial irritation and pleurisy, were doubtless due to one and the same cause—namely, the depraved state of the blood, and the presence in this fluid of some abnormal material, which so far deranged the nutrition of the nerves, muscles, and the pulmonary mucous membrane, as to induce enough irritation to excite the symptoms described.

A large proportion of our patient's suffering was due to a highly irritable state of the stomach. The least provocation brought on nausea and vomiting. The appetite was very defective, and the amount of food taken very small. Solid food, especially of an animal kind, was not borne by the stomach. On one occasion he craved very much for some mackerel, and I was induced to

allow it him; but he suffered for many days afterwards from nausea and vomiting, the oily fish having probably proved an additional irritant to the gastric mucous membrane.

This man exhibited another remarkable symptom, but one of rather unfrequent occurrence in similar cases—namely, a partially amaurotic state, limited at first to one eye. Our attention was called to this symptom on the 7th of June, and the following note was made: "At this time the dropsical swelling of the trunk is considerable, and the face puffy. On examining the eyes, each cornea exhibits a large and well-marked arcus senilis. The sight of the right eye is much impaired, and everything appears of a dusky colour and indistinct. This affection of his vision came on as a dark spot before the eye; next day this was surrounded by a red circle, which has since died away, leaving everything dusky. The left eye seems sound. Both pupils contract under the influence of light." This symptom continued unchanged until three hours before his death, some months afterwards, when he became totally blind.

To what are we to attribute this amaurotic state? Is it an affection of the retina or of the brain? Its limitation to one eye, in the first instance, indicated an affection of the retina of that eye. There was no other cause for the blindness as far as regards the eye itself, for its dioptric media were essentially sound. The first appearance of the

impaired vision as a dark spot, was like one of those subjective phenomena to which changes in the state of the retina are apt to give rise, and was no doubt caused by a disturbance of nutrition, dependent upon the abnormal state of the blood.

The nausea and vomiting were also probably caused by an irritated state of the gastric mucous membrane, arising from the diseased blood. It is, indeed, to this poisoned state of blood, resulting from the formation or retention in it of substances which would have found a ready exit through the kidneys, had they been in a sufficiently healthy state, that most of the symptoms from which this patient suffered were due In this respect all forms of diseased kidney are much alike; all tend to produce similar secondary phenomena; whether large or small, the diseased organ fails to excrete the normal elements of the urine; and these, or certain of them, accumulating in the blood, affect all the tissues and organs more or less, and at length exert their baneful influence on the nervous system, disturbing its functions in the most serious manner.

Our patient remained under observation for eight months. Dropsy, varying in amount, was always present; and to diminish this, and promote the action of the kidneys, was the aim of our practice. Those students who watched this case throughout, had a good opportunity of witnessing the trial, in succession, of various diuretic remedies.

Those which seemed to exercise the best influence were the infusion of digitalis, the bitartrate of potass, the benzoate of ammonia, and lemon-juice. The compound powder of jalap and the compound gamboge pill were often had recourse to, as drastic purgatives, with the view of carrying off water from the system.

These remedies were employed with very variable success. At length the dropsy seemed to gain ground in a very decided way. The scrotum became enormously swollen, and the lower extremities likewise. A small slough formed at the bottom of the scrotum, from which in a few hours two pints of fluid drained away, affording great relief to the extreme tension of this part. After this the fluid continued to flow only in very small quantity.

As the dropsy was increasing, and the quantity of urine secreted was rather on the decrease, and the patient exhibited some degree of drowsiness, it was determined to give the extract of elaterium. It was administered in the form of a pill, in doses of quarter of a grain every morning: it created some purging and great sickness. It was now tried in combination with hydrocyanic acid; its emetic action was thus partially restrained without impairing its purgative influence, and it was borne well for the greater part of thirteen days, and a large quantity of water flowed away per anum. Towards the end of this time it again began to

create very troublesome vomiting, and produced so much distress to the patient that it was found necessary to give it up.

A new drain was now established from a wound in the left leg, which was caused by the patient accidentally striking his leg against an iron bedstead. A slough formed in this spot, and from it a large quantity of fluid drained away: after several days, I thought it advisable to enlarge the wound by an incision, and thus give free exit to the accumulating fluid.

Notwithstanding all this, the dropsy increased during the month of August and the first days of September. On the 6th of the latter month, his breathing became very much affected. Moist crepitation and rhonchus prevailed over both lungs. The patient was unable to lie down. The dropsy was everywhere much increased; and the urine was highly smoky, and became almost solid with nitric acid.

An incision of about an inch and a half in length was made through the skin and areolar tissue of the right leg behind the inner malleolus. From this a large quantity of fluid drained away; between two o'clock on the afternoon of September 7th, and the same hour on the 8th, as much as three pints nine ounces were collected. The fluid thus obtained was clear, of a pale yellow colour, specific gravity 1010, slightly acid, but very soon becoming alkaline. The addition of

nitric acid rendered it almost solid. During this period the kidneys excreted two pints of urine, specific gravity 1025. The effect of this great drain of fluid was, that on the 8th, the day following that on which the incision was made, the dropsy was everywhere much reduced, and the chest-symptoms were very much relieved—indeed they had almost disappeared.

On the 9th three pints, and on the 10th two pints of fluid oozed from the leg, and the dropsy became still further diminished, nor did the chest-symptoms show any disposition to return; but the patient was evidently weaker, and the areolar tissue near the incisions had become erysipelatous and sloughy. Fluid continued to ooze in diminished quantity from both legs, and large sloughs formed. The strength gradually failed. On the 24th he became quite blind, and about twenty minutes before three o'clock his left arm became convulsed. At three he died, the intellect remaining clear to the last, but he was very drowsy for some time before death.

The post-mortem examination was made on the 25th, about twenty-four hours after death. The body presented the appearance of great general anasarca. The belly was the only part which was examined.

Upon opening the abdominal cavity, the intestines were observed to be universally of a leaden hue, and covered more or less completely with

layers of rough lymph, which had all the appearances of having been recently deposited. The peritoneal sac contained a considerable quantity of a somewhat turbid serous fluid; and towards the region of the liver there was about a teacupful of healthy-looking pus; but whether this was free, or whether it was contained in a kind of thin sac of false membrane very easily broken down, was doubtful. The liver itself was apparently quite healthy, as also was the spleen, except that the last-named organ was somewhat larger than natural. The kidneys were large, and presented exceedingly good specimens of fatty degeneration of these organs, exhibiting, under the microscope, the usual characters of this form of renal disease.

Of the waxy enlargement of the kidneys the following case affords a good illustration:—

Case XV.—Charles Adams, æt. 25, a tailor, admitted into Fisk ward (vol. xliii.). He was born in the country, but has passed the last seven years of his life in London. When he first came to town, and for the four succeeding years, his habits were highly intemperate, for he usually drank seven or eight pints of porter in the day, in addition to ten or a dozen glasses of gin at night; but at the end of this time he took it into his head that so much drinking had affected his constitution, and he therefore left it off entirely. About this time, *i.e.*, three years prior to his admis-

sion into the hospital, he contracted gonorrhœa and syphilis, for the latter of which affections he was put under the influence of mercury, by which his mouth was kept sore for some time. Notwithstanding this, the chancre was followed six months afterwards by secondary symptoms; which, under sarsaparilla, soon got well. Eight weeks subsequent to this, one of his testicles became much swollen; and this affection was so severe as to cause him to lie up for more than two months. Last winter he suffered much from what he calls *rheumatism*, but which rather appears to have been some further consequence of the syphilitic poison. At this time both knees and ankles were slightly swollen; and he suffered very much from pain in the forehead, and in the bones of the legs and fore-arms. This pain was always worst at night, and the affected parts were exceedingly tender to the touch.

Soon after he recovered from the inflammatory affection of the testicle, *i. e.*, about eighteen months before his admission into the hospital, he was one day seized with violent pain in the belly, extending from the right hypochondriac region across to the left. This pain he describes as having had the character of that which attends cramp, and after its first occurrence he noticed that his abdomen seemed to be larger than before. The pain continued to recur in paroxysms daily for a week, and the abdomen appeared to swell

more and more after each attack; and at the end of this time it attained the size which it had on his admission. He appears to have suffered much from looseness of the bowels at this time; but he states that he has never been jaundiced, and that he never noticed any puffiness or swelling of his face. His urine has generally been high coloured, and he has usually passed about the normal quantity.

He is a pale, sallow, rather light-complexioned man, exceedingly thin and emaciated, having a slightly œdematous condition of the legs, and a belly of considerable size. A careful examination showed that the increased size of the belly was caused by an enormous enlargement of the liver—this organ appearing to extend quite down into the iliac region on the right side, and a considerable way into the lumbar on the left—and also by the presence of a moderate amount of fluid in the peritoneal cavity. There is much tenderness all over the region of the liver; the superficial abdominal veins are distended; there are no indications of nodes in any part of the body. Heart and respiratory sounds normal; the bowels are much relaxed, and he states that a short time ago his motions had very much the appearance of plaister of Paris; pulse 76. Urine rather more than two pints, of the natural colour, clear and transparent, of acid reaction, of specific gravity 1012; depositing on standing a slight, cloudy

sediment, and highly albuminous, so as to become almost gelatinous when boiled. The sediment, when examined under the microscope, is seen to be composed of faint, transparent, fibrinous casts, of large size, in very small number, with still fewer casts of a waxy character of small size. In addition to the waxy-looking casts above mentioned, what appear to be the fragments of broken-up epithelial cells, together with a few cells much resembling those of pus, are seen scattered over the field. Occasionally some of the above-described epithelial *débris* can be seen entangled in a tube-cast.

Without reading you all the details of this case, which extended over a long period, I shall confine myself to stating that this patient remained in the hospital for nearly seven months, when death took place. The symptom from which he suffered most was diarrhœa, which in a greater or less degree was almost constant during the whole of this time, and which nothing appeared to hold in check for more than a few days.

The quantity of urine passed varied from a pint to more than four pints in the twenty-four hours, the average being about two pints, and the variation being, in some measure at least, dependent on the amount of aqueous fluid discharged by the bowel. The amount of albumen in this secretion varied slightly from day to day, but was always great, the urine when boiled often becoming almost

solid; the density of the urine ranged between 1010 and 1016, the average being 1012. The sediment deposited by the urine, even after standing twelve hours, was always exceedingly scanty; and, although very often examined, it invariably exhibited, both to the unaided eye and with the help of the microscope, the characters above recorded, being always remarkable for the paucity of casts it contained, a careful examination on some days failing to detect even a single one.

At first this patient was treated with krameria and opium, and for some time an ointment containing mercury and iodine was rubbed in over the region of the liver; then sulphate of copper and acetate of lead, each combined with opium, were tried in turn, but without any material benefit resulting. After a time, the compound infusion of catechu was given, and enemata of starch and laudanum regularly administered; these, too, failing to check the diarrhœa, infusion of matico was had recourse to, and opium suppositories were introduced into the rectum. Tannic acid, also, was exhibited, but without producing any good effect; and the only thing which materially relieved the purging, though this was only for a few days, was the decoction of Indian bael.

On the whole, perhaps, had it not been for the diarrhœa, this patient would not have suffered very much during the greater part of his stay in the hospital; but he occasionally had attacks of

severe pain over the region of the liver, which were usually relieved by sinapisms; once a blister was applied in this situation. After he had been under treatment some time, it was noticed that his motions, which, though always watery, often varied much in colour (being sometimes almost white, at others very dark, and generally horribly offensive) contained some joints of a tape-worm. Some oil of male fern was, therefore, given him, and the parasite (five or six yards long) was expelled, but without in the least degree lessening the diarrhœa.

At length the œdematous condition of the lower extremities increased, and the enlargement of the abdomen also became greater, while the amount of urine passed occasionally fell as low as a pint in the twenty-four hours; and whenever this occurred, he became drowsy and sleepy, and evinced a tendency to fall into a comatose condition, from which state, however, he on two or three occasions roused up again. Under these circumstances, we endeavoured to promote the action of the kidneys by the exhibition of diuretics; and those which we employed for this purpose were the bitartrate of potash, the compound decoction of broom, and the benzoate of ammonia—all with more or less success. The diarrhœa, however, baffled all our efforts, exhausting the patient to the last degree; and on December 5th he was seized with an epileptic fit of

a most severe character, which lasted more than three hours, and then left him in a comatose condition; but from this he roused again the following day. From this time, however, he gradually sank, and died, worn out and exhausted, on December 18th.

The following is the report of the examination of the body of this man, as drawn up by Dr. Conway Evans:—

The body was examined on December 20th, about thirty hours after death. It was greatly emaciated, and the lower extremities were highly œdematous.

On opening the belly, the peritoneal cavity was found to contain a considerable quantity of a clear serous fluid, and a liver of enormous size. The latter was of a light fawn colour, and of a waxy appearance; its surface quite smooth, but undulating, and studded with occasional yellowish-white spots which varied in size from that of a pin's head to that of a cob-nut. The capsule of Glisson was not in the least thickened, but, on the other hand, perfectly smooth and transparent. On taking out the liver, this organ was found to weigh 8 lbs. 6½ oz.; and its cut surface presented an irregular intermixture of dirty white and red, with great numbers of yellowish-white (not encysted) tumours of a cheesy consistence scattered throughout its entire substance. These tumours were, generally speaking, larger

than those which were visible on the exterior of the organ, and varied in size from that of a pin's head to that of a walnut. The thinnest sections which could be obtained, when subjected to miscroscopical examination, were invariably found to be exceedingly opaque, so as to render the exact structure very difficult of determination. All traces of cell-radiations, or rather of radiating ducts with their contained cells, were (apparently) almost obliterated; while the bulk of each lobule between the interlobular plexus and the intra-lobular (hepatic) vein appeared to consist of masses of pale, whitish, unorganized, fibrinous-looking matter, with here and there patches of oil-globules. This appearance was, no doubt, due to numbers of the liver-cells, lying in many planes, and superimposed, as it were, one over the other, viewed *en masse*. The liver-cells generally were very pale, smooth and white, and of very small size—much smaller than those of a healthy liver—and their outline was very indistinct. Most of them were entirely devoid of oil, and none of them had anything of a bile-tint; nor did they contain any granular matter, as in health. The nuclei in most of the cells were also indistinct, and, indeed, in a large proportion altogether invisible. Some of the cells, on the other hand, were crammed with oil. The whitish tumours, when examined under the microscope, were found to consist of finely-granular amorphous matter,

interspersed with numerous dark-looking oil-cells.

The stomach and small intestines appeared healthy. There was no ulceration, thickening, redness, nor apparently any other morbid condition of Peyer's glands; nor could any portion of a tape-worm be discovered. In the large intestine, the mucous membrane generally appeared to be somewhat thickened, and the solitary glands were here slightly enlarged. The spleen was of large size and exceedingly firm consistence: it weighed 15 ounces. The lungs appeared to be healthy; they were freely crepitant throughout; there were no pleuritic adhesions. The heart was exceedingly small, and very flabby; it weighed barely 5½ ounces; all its walls appeared equally atrophied. The fibrous tissue of all the valves (on both sides) was somewhat opaque; in other respects the valves seemed healthy. There was no atheromatous state of the arteries.

The kidneys were very large; equal in size, and alike in appearance: one of them weighed rather more than 8 ounces. The capsule was readily separable, and the surface was then seen to be of a pale fawn colour, smooth and waxy-looking, but raised into largish, though not prominent, undulations. The lobular markings were entirely obliterated, but there was nothing of the granular appearance of a *granular fat kidney*. When examined under the microscope, the

tubular structure could be made out only with considerable difficulty; and in some places, indeed, this was quite impossible. All the epithelium which could be seen appeared very far from normal, of a yellowish colour, and very flat, and looking as if shrunken, though still firmly adherent to the tubular walls; but from a great number of the tubes all traces of epithelium had entirely vanished, nothing remaining save the basement membrane and matrix, which were highly glistening, and often appeared to be thicker than natural, and in many parts studded with minute globules of oil. None of the tubes appeared to contain any of the fibrinous substance which was observed in the urine during life; neither was there any appearance of desquamation nor of crumbling of the epithelium, so as more or less to fill up the tubular cavities. The Malpighian capillaries were much thickened, and very opaque; and the coats of the minute renal arteries, particularly the longitudinal fibres, were greatly hypertrophied. In many parts these vessels were exceedingly tortuous; and occasionally the canal of a minute afferent artery could be seen filled with a mass of highly refracting globular particles (oil, or phosphate and carbonate of lime, or both), and the Malpighian body to which it led atrophied and shrunk up.

In conclusion, let me again remark, that it seems

to me quite clear, looking simply at the organic alterations which the kidneys themselves undergo, that the several pathological conditions of these organs which I have just mentioned to you cannot be classed as one and the same; and when we take into account the clinical history, this conclusion seems still more likely to be the just one. What can be more different than the respective clinical histories of the case just related, and of that to which I first called your attention in this lecture; or of those cases of acute dropsy with hæmaturia referred to in former lectures, or of others which I shall presently bring before you! Can it be possible that different clinical phenomena may coincide with one and the same pathological condition?

Just as well might we affirm that all the enlargements and contractions which the liver is apt to experience, are due essentially to one and the same morbid state. And I may here observe, that there is a close analogy between the diseases of the kidney and those of the liver, and that a comparison between the various diseased conditions of these two organs tends to explain their true pathology in a remarkable manner. Thus, for example, enlargements of the liver, like enlargements of the kidney, are of two kinds—*acute* and *chronic*. The acute enlargements of the liver are connected with inflammatory states of that organ, just as acute enlargement of the kidney is associated with

inflammatory conditions of that organ. So, also, of the *chronic* enlargements of the liver, we have the *waxy* degeneration and the *fatty* degeneration; both essentially analogous to similar conditions of the kidney.*

I shall proceed with the consideration of this subject in my next lecture.

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* The following table exhibits the classification of the affections of the kidney referred to in the lecture, which seems most consistent with clinical observation and experience:—

A.—Cases in which dropsy is urgent and acute, and albumen abundant.	Acute dropsy. Dropsy after scarlet fever.	Acute enlargement of kidney.
B.—Cases in which dropsy is not a prominent symptom—is very variable in amount—chronic—and may be absent. Albumen variable.	Chronic enlargement of kidney.	Fatty disease (Bright's kidney). Waxy disease.
	Chronic contraction of kidney.	Chronic nephritis, or chronic wasting kidney. Gouty kidney.

Although it is the rule that the fatty enlargement of the kidney remains without diminution during the life of the patient, still there are, as Dr. Johnson informs me, a few rare and exceptional cases in which this state of kidney assumes the wasting tendency, and becomes very much reduced and contracted, the urine exhibiting the granular and large waxy casts which are characteristic of that chronic state.

LECTURE IV.

On those diseases of the Kidney with which are associated an albuminous condition of the urine and dropsy.

I CONCLUDED my last lecture with the details of two cases illustrating the two forms of chronic enlargement of the kidney—namely, the fatty kidney and the waxy kidney.

In forming your diagnosis, which is sometimes difficult, you will have to keep in view the distinctive features of the fatty enlargement of the kidney, as compared with those of the chronic contracted kidney, and of the waxy enlargement. The contracted state is much more frequent than that of enlargement, whether fatty or waxy. The fatty condition is generally attended with dropsy, much greater in amount and of a more persistent and obstinate character than either of the others, which, unless accompanied by some diseased or enfeebled state of heart, are frequently quite free from dropsy, and generally have it only to a slight amount. The presence of abundant fat-cells, fatty casts, and free oil, with albumen in large quantity, in the urine, would indicate fatty kidney, although, for a time at least, such a state of disease may exist without these appearances;

whereas, in the contracted kidney, fat-cells or fatty casts are either not present in the urine, or exist in but small number, and only occasionally, and in its more advanced stages, and the albumen is never by any means so abundant as to render the urine nearly solid under nitric acid and heat.

The waxy kidney exhibits clinical phenomena sufficiently distinct from those of the fatty disease. Instead of the white anæmic complexion, with puffy face, which accompanies the latter malady, you will find the patient looking sallow, and, generally speaking, free from any swelling of the face. Dropsy either does not exist at all, or is very trifling. It does not show itself until the disease has advanced considerably, and it rarely, if ever, is so prominent and chronic a symptom as in the fatty disease, nor is it often as much as in the contracted kidney. In a well-marked example of the disease, of which I lately witnessed the fatal termination, in the person of a medical man, there was no sign of dropsy throughout his long illness of two years. In most of the cases the peculiar waxy degeneration is not limited to the kidneys, but affects the liver and spleen, causing enlargement of these organs. The increased size of these viscera, therefore, becomes an aid to the diagnosis of this affection, in addition to those signs which may be obtained from the altered urinary secretion.

The condition of the urine resembles that found in the waxy disease as regards the quantity

of albumen, which is generally large. But fat-cells are not found, nor the fatty casts; transparent fibrinous casts and the *débris* of epithelium are the most common appearances. But these may be absent: and in both forms of enlarged kidney this absence of all sediment is not uncommon.

There is quite enough evidence to show that this disease is a peculiar cachexia, allied perhaps to scrofula, which shows itself mainly in the diseased states of kidney, liver, and spleen. Whether the occurrence of the waxy deposit in the kidneys alone, (the liver and spleen being quite free,) is to be regarded as an indication that the malady is only in an early stage, I cannot say. You will find in Dr. Johnson's book an example of this disease limited to the kidneys, and some other cases illustrative of the general cachexia.*

Let me now proceed to the second class of cases —viz., that in which the kidneys experience a diminution in size, and are decidedly smaller than they should be. The different varieties of contraction of the kidneys are due, so far as our knowledge at present enables us to state, to one

* On the subject of the waxy disease, see a paper by Drs. Gairdner and Drummond, in the *Edinburgh Monthly Journal* for May, 1854, and an article by Dr. Parkes in the *British and Foreign Medico-Chirurgical Review* for October, 1854.

and the same pathological condition, which, I need scarcely say, is totally different from any of those which lead to great enlargement of these organs, and which is essentially slow and chronic in its nature. In this state the kidneys often suffer a remarkable diminution in their size; they shrink up, and become more or less fissured or lobated; their capsule is generally remarkably thickened, and peels off readily; and when they are divided longitudinally, the remarkable shrinking is seen to have taken place mainly at the expense of the cortical substance, so as to reduce this portion of the kidney to the thickness of a mere rind, extending along the bases of the medullary cones. With all these characters, if the disease be sufficiently advanced, there are very often, scattered in greater or less numbers throughout the cortical substance, cysts of various sizes. These cysts vary in dimensions from exceedingly small, microscopic objects—probably, as Dr. Johnson suggests, simple dilatations of uriniferous tubes—up to such as are as large as a nut, or even larger.* The elements of the kidney can gene-

* I am not prepared to enter into the *great cyst-controversy*. From all I have seen, it would seem to me that the simple and natural explanation offered by Dr. Johnson may be regarded at least as one way, and by far the most frequent way, in which these cysts are formed. But I can conceive it quite possible that cells may occasionally form in the uriniferous tubes, as suggested by Mr. Simon, which, by enlarging, produce those remarkable renal cysts or pseudo-hydatids which have so long attracted the attention of morbid anatomists.

rally be found in cases of this kind; but their characters are very different from those which they exhibit in a state of health. The epithelium is seen to be more or less wasted, and to have undergone, or to be undergoing, disintegration; many of the tubes are found to be denuded, so that the basement membrane and matrix only are left: some of these denuded tubes are found to be dilated into small cysts, while others appear to be undergoing a process of atrophy, and are very much smaller than natural; the coats of the minute arteries, particularly their longitudinal fibres, are often more or less hypertrophied, and these vessels themselves frequently very tortuous (the canal of a minute afferent artery being sometimes blocked up with oil, while the Malpighian body to which it leads is wasted and shrunk up); and the Malpighian capillaries are generally thickened and opaque. In some kidneys of this kind, you will find distinct streaks of a whitish material following the direction of the tubes of the cones: these you may pick out with the point of a knife or a needle, and upon examination you will find them to consist of lithate of soda, which had remained in the tubes. When this deposit is met with in the kidneys, the same salt will be found deposited, in greater or less quantity, in other parts of the body.

We meet with very different degrees of contracted kidneys: nevertheless, as I just now mentioned, they are all associated with one and the

same pathological condition, and the rationale of the morbid process by which the contraction is effected may probably be explained in some such manner as the following:—Some causes or other come into operation which excite disturbances of the nutritive processes to a greater or less degree, and interfere with the normal development of the blood, this fluid becomes contaminated, and some or all of the contaminating ingredients are conveyed to the kidneys to be eliminated by these organs. In their passage through these glands, these poisonous elements create a highly disturbed state of their nutrition—a state, possibly, in some degree inflammatory, but chiefly atrophic, the tendency of which is to cause the organs to waste and shrink.* The kidneys, thus injured, are rendered unable to carry off in due quantity some of the elementary constituents of the urine; and these, accumulating in the blood, become a

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* The evidence of an inflammatory process having any share in the production of this state of kidney appears to me to be very unsatisfactory; and on that account I cannot adopt the term applied to this disease by my friend Dr. George Johnson, "*chronic nephritis.*" If the essential pathological change in these kidneys be inflammation, that process produces results of a very different kind to what we notice elsewhere. The pus-globules which are sometimes observed in the urine of patients labouring under the disease do not necessarily come from the tubes, but rather from the mucous membrane of the infundibula, pelvis, and ureter; and they are probably due to the irritating quality of the urine.

further source of mischief, in fact, a further source of poisoning, not only to the kidneys, but also, secondarily, to almost all the other organs of the body.

Now, one state in which this train of symptoms is very apt to occur, is that condition of the system which we call *gout;* a peculiar state, in which some morbid material—uric acid, perhaps, or some compound of uric acid, or, at all events, something very nearly allied to this substance—becomes developed in abnormal quantity in the blood, operates as a poison upon the joints, and likewise irritates the kidneys, and thus tends to keep up a gradual process of retention of morbid matters in the system, which ultimately leads to the destruction of these organs. You will not suppose that I limit the causation of this contracted state of kidney solely to gout: there are many cases in which we find no trace of gout; yet there is a general constitutional condition, analogous in many respects to that which gives rise to gout, where the assimilative processes are much at fault, and where the blood is ill-supplied and poor.*

Let me here again refer to the analogy between hepatic and renal diseases. In the contracted, fissured, and granulated liver (the true cirrhosis—*Anglicè,* hob-nail liver), which is often met with

* See Lect. XII. on Gouty Kidney.

in hospital practice giving rise to ascites, you find the analogue of the contracted kidney. The two diseases often occur simultaneously in the same person, apparently owing their origin to one and the same cause—namely, irregular and intemperate habits. Cirrhose is an atrophic condition of the liver from a deficient and depraved nutrition: many of the lobules and ducts of the organ become obliterated and wasted; much of its vascular system experiences the same fate; and here and there occur accumulations of cells loaded with fat. There are but few lobules which escape injury and retain their healthy character; the capsule of Glisson is thickened and condensed in structure, and shows a tendency to shrink, as the material of a cicatrix in the skin or mucous membrane does. The diminution in size of these livers is due partly to waste of substance, and partly to this shrinking or contracting tendency of the diseased Glisson's capsule.

Some able pathologists are content to believe that all these effects are due to chronic inflammation, and ascribe this to the direct poisoning influence of alcohol frequently indulged. Plausible as is this doctrine, I confess myself unable to assent to it; for I have no doubt the disease occurs where the habitual indulgence in fermented liquors has never existed, and unquestionably very many for years accustomed to the free use of such fluids escape all indications of the malady.

It is likewise the opinion of some that the contracted liver is always preceded by a stage of enlargement. This I think a very doubtful view. Without question, there are large livers, in which may be found patches affording the appearance of the hob-nail structure, and others exhibiting the fatty condition, and others again that of healthy liver. It seems to me very doubtful that such livers ever attain the condition of the contracted liver. Ascites developes itself very slowly over a period of many months; but general nutrition goes on fairly, and a good quantity of bile is secreted, the patient suffering chiefly from the bulk of the liver and the distension of the belly. I have seen cases in which such livers have become reduced in size, but never to such an extent as to be otherwise than still enlarged.

The enlargement in these cases appears to me to have been due to the fatty disease affecting parts of the liver, while other parts, either previously or subsequently, have been the seat of cirrhosis. Whether there is any strictly analogous condition of kidney with this of liver, I am unable to say with any confidence.

I am not able to illustrate the state of chronic contracted kidney with the full history of any case recently in the hospital; but I think we may derive instruction from investigating a case now under treatment, respecting the diagnosis of which some difference of opinion may and

does exist among those who have watched its progress.

Case XVI.—The case to which I refer is that of a woman named Catherine Henry, now in Augusta ward, (Vols. xl. p. 59, and xlii. p. 88.)—Our patient has gone through a considerable amount of wear and tear, partly from several severe illnesses which she has had, and partly in consequence of intemperate habits. She tells us that she is thirty years of age, and married; that she has lived in London the last ten years, following the occupation of a waistcoat-maker; and she confesses that her habits have been intemperate, particularly during the last five years, her chief beverage having been brandy-and-water. Her serious illnesses appear to have begun about three years ago with an attack of rheumatic fever, which laid her up for two months. I may here remark, that when rheumatic fever occurs in persons between the ages of twenty-five and fifty, it borders very closely upon gout in its characters, and is very difficult to distinguish pathologically from an attack of acute gout affecting a great number of joints. You have the same profuse acid sweats, and the same pain, tenderness, and swelling of the joints, in the two cases; but there is this difference between these two diseases—viz., that in acute gout there is far less liability to affections of the heart—endocarditis or pericarditis—than in acute rheumatism.

About four months after the first attack of rheumatic fever, our patient had a second; and about six months subsequent to this, a third; and from the time of the first attack of this disease, she became subject to shortness of breath and palpitation on the least exertion. Possibly there may have been pericarditis at this period, followed by adhesion between the two opposed pericardial layers. There does not now appear to be any decided valvular disease. But, although there is now no distinct bellows-sound, indicating valvular imperfection, some of you may have observed that there is some degree of roughness accompanying the first sound of the heart, and best heard at the apex. This is by no means unfrequently the case in persons who have had rheumatic fever once or twice, in consequence of the fibrous structure, which enters so largely into the formation of the valves of the heart, having lost its suppleness and flaccidity, but yet not to so great a degree as to render the valves incapable of closing their respective orifices.

Two years ago, this woman noticed that her eyelids and face were puffy and swollen, generally in the morning when she got out of bed: about the same time, too, she became subject to more frequent calls to pass her water than usual, especially at night, being disturbed frequently, and obliged to get out of bed for this purpose. This symptom, in the absence of clear indications

of bladder affection, is highly suggestive of chronic disease of the kidneys. I am unable to give you any very good explanation of this phenomenon: the kidneys being assumed to be irritated, the bladder may be supposed to partake in the irritation sympathetically, and thus give rise to frequent micturition; or the urine itself may be irritating to the bladder, and thus excite this viscus to empty itself frequently.

The next point in the history of this patient is the occurrence of swelling of the ankles, soon followed by more general dropsy, affecting the legs, thighs, upper extremities, and belly. The quick development of general dropsy ought always to excite suspicion of diseased kidneys, and especially when the face is involved, whether first or last. The dropsy most liable to be confounded with that dependent upon renal disease is that which arises from disease of the heart; but the distinction between them is, generally speaking, simple enough; for, whereas in cardiac dropsy the parts most dependent are the first to become swollen, except under peculiar circumstances, in renal dropsy the converse of this commonly prevails, the highest parts of the body, as the face, eyelids and scrotum, being usually the first to become œdematous.

The enlargement of the belly, as noticed in our patient, clearly arises from the accumulation of fluid in the peritoneal cavity. In the absence

of any distinct peritoneal affection, this dropsy must be caused by some morbid condition of the liver; and looking at the intemperate habits of this patient, it seems reasonable to suspect such disease in her case. I have already alluded to the analogy between, and the frequent coexistence of, cirrhosis of the liver, and the chronic disease of the kidneys, which ultimately leads to the wasting and atrophy of these organs. But the morbid processes in the liver and in the kidneys, though they may be similar, if not identical in their nature, may not go on *pari passû*—that is to say, one may advance much more rapidly than the other; and this is probably the case in our patient, the disease of the kidneys being in advance of that of the liver. However this may be, there seems good reason to believe that, in the early stages of chronic renal disease, a dropsical accumulation taking place pretty rapidly into the abdominal cavity is an indication that the liver is apt to be suffering from a diseased state analogous to that of the kidneys, and creating obstruction to the portal circulation.

About twelve months ago, this woman was admitted into the hospital under my care; she was then suffering from considerable general dropsy, which was attributed to exposure to cold, an acute attack supervening upon the more chronic disease. She remained in the hospital some time, and she was then passing from two to three

pints of urine daily, varying in density from 1010 to 1015, and containing a considerable quantity of albumen. The treatment then adopted consisted at first in free purging (the hydragogue purgatives being those which were employed), and subsequently in the exhibition of the tincture of the sesquichloride of iron, as well for its diuretic properties as for its power of improving the quality of the blood. Gallic acid was also given, with the view of restraining the flow of albumen from the system. Under this plan, together with the occasional employment of the hot-air bath, she left the hospital in August (1853) comparatively well; but her urine still contained a minute quantity of albumen, though it did not exhibit under the microscope any tube-casts or other indications of renal irritation.

After leaving the hospital, she remained tolerably well, having, however, a little œdema of the feet and ankles occasionally, and "taking a little inward medicine now and then, such as cream of tartar and salts;" and following out, no doubt, her old habits of intemperance for about eight months, when a similar train of symptoms, viz., those of renal dropsy, again occurred. Patients with chronic disease of the kidneys are very apt to have dropsy develop itself rapidly if they get an attack of bronchitis, or any other affection which either embarrasses the pulmonary circulation, or checks the action of the skin. The most probable

explanation of this is that, in consequence of the impediment to the circulation through the lungs, or in consequence of the interference with the cutaneous secretion, the blood, already deviating considerably in its composition from the healthy standard as a result of defective renal action, becomes still further altered, and partly owing to the impoverished state of the blood, and partly to impediment to the general capillary circulation, the escape of the *liquor sanguinis* through the walls of minute blood-vessels becomes a matter of very ready accomplishment.

On May 20th (1854), this woman was again admitted into the hospital, and the following description of her then condition was entered in the Case Book:—"A pallid, sallow, puffy-faced, rather thin woman, with black hair and greyish eyes; having considerable œdema of the lower extremities, with, perhaps, a small quantity of fluid in the peritoneal cavity; complaining of pain underneath the left breast and about the lower angle of the left scapula, and of heaviness in the head, being constantly very drowsy and sleepy; having a very distressing cough, with slight mucous expectoration, and breathing rather hurriedly (twenty-four times a minute), the pulse being 76. Much rhonchus and large crepitation are audible throughout both lungs; her appetite is bad; her tongue is coated with a thick, whitish fur, and her bowels are habitually confined. She

passes daily between two and three pints of pale urine, of low specific gravity (1009—1010), which contains a considerable quantity of albumen, roughly, about one-third its bulk."

Sallowness of complexion is not amongst the least significant of this woman's symptoms. It is a very frequent, almost constant concomitant of the contracted kidney; so much so, that one is often led, in passing through the wards and elsewhere, to fix on a case of this kind from the complexion alone, and with a correct result. In other forms of renal disease the complexion is different: in the dropsy after scarlet fever the face is swollen and peculiarly blanched; with fatty kidney the skin has a pale, waxy look; in the acute dropsy the face is pale and white, but less so than in that which follows scarlet fever; in the waxy enlargement of the kidney there is, with great emaciation, a greater amount of sallowness than we witness in cases of contracted kidney.

It is a good clinical exercise for you to watch the physiognomy of disease, the peculiar expression of the countenance, and the complexion; and in no class of diseases will you find this practice more useful than in renal affections. How often will a practised eye detect by the peculiar sardonic expression, incipient pericarditis in rheumatic fever! How often does the face suggest the tubercular cachexy, or a cancerous affection, or some form of abdominal disease!

In addition to the dropsy of the extremities, &c., there was a more or less œdematous state of both lungs, and the history indicated that this had come on after a recent exposure to cold. This congested state of lungs, therefore, served to increase the dropsy elsewhere, and I was led to regard the case as one of general dropsy in a certain degree dependent upon an acute irritation of the kidneys, the acute affection having supervened upon a chronic diseased condition of these organs; which, together with the embarrassment to the pulmonary circulation, would explain the phenomena exhibited by this patient. But you will not lose sight of the fact that embarrassed pulmonary circulation and bronchial irritation are often *effects* of the poisoned state of blood induced by chronic renal disease; a point of great interest with reference to the pathology of bronchitis.

The sediment which the urine deposited on standing, when examined under the microscope, was found to consist of granular casts and some waxy casts of rather large diameter, some of which contained one or more fat-cells entangled upon them, with here and there a few free oil-globules. There were also numerous pus-cells and much vaginal epithelium. Pus-cells and vaginal epithelium, I should tell you, are very common in the urine of women who are suffering from more or less irritation in the uterine organs, accompanied, perhaps, with leucorrhœa; and the appear-

ance of pus in the urine under these circumstances has often puzzled the practitioner, and led him to imagine that some suppurative process was going on in the kidney. And a slight leucorrhœal discharge will often give rise to a considerable quantity of pus in the urine.

What, then, is our diagnosis in this case, and on what does it rest? It is plain, from the history, that our patient has been the subject of renal disease since a time prior to her first admission into the hospital—that is, more than a year. It is highly probable that, during all this time, she has been passing albumen in her urine, and, owing to attacks of cold and catarrh, she has experienced no less than three aggravations or exacerbations of the symptoms; the dropsy supervening and subsiding with the access and relief of the colds and of the bronchial attacks.

Now, it is not likely that this woman's symptoms could be caused simply by a succession of acute attacks affecting the kidneys. The amount of dropsy on each of these occasions was too small for that form of disease, nor did the urine quite correspond with that which usually accompanies it; it was too copious, free from blood (which is generally present in acute dropsy), and contained too few epithelial casts and particles, which in such cases are usually thrown off in considerable quantity.

Is there a fatty or a waxy enlargement of the

kidneys, or does the disease consist in a contracted state of these organs? The weight of evidence seems to me to favour this latter conclusion. In the former disease there is usually much more pallor and much more dropsy than our patient exhibits; the dropsy has subsided too readily and completely between the attacks, and the amount of albumen in the urine has fallen too low, for this slowly progressive disease. The occurrence of fat-cells in the urine would seem to favour this diagnosis; but it is well known that such cells as were observed in the secretion in this case are frequently generated in the more advanced stage of chronic contracted, wasting kidneys.

I must give the negative, also, to the supposition that this patient labours under the waxy enlargement of the kidney. The emaciation is hardly sufficient for this disease; and the absence of enlarged liver and spleen are opposed to this view of the case. The dropsy, also, is rather too much for that disease, and the fact of its subsidence and recurrence is not favourable: the urine, moreover, is less albuminous and less dense than is usual in the cases of waxy kidney, and the sedimentary matters are not of the kind met with in that disease.

I come, therefore, to the conclusion that this is a case of chronic contracted or contracting kidney. The urine being sufficiently abundant, pale, low in specific gravity, and, except during the severity

of the acute attacks, containing albumen in small quantity, confirms this view of the case, which is likewise quite consistent with the long continuance of the disease and its occasional exacerbations.

Our patient's symptoms have on this, as on the former occasions, yielded sufficiently readily to the treatment adopted, which has consisted in pretty free purging, and the use of the non-irritating diuretics, such as bitartrate of potash first, and afterwards the benzoate of ammonia. The catamenia had been suppressed for three months; and this led me to give the sulphate of iron with sulphate of magnesia, with apparent good effect in the restoration of this function. Twice this patient suffered, while in the hospital, from rather profuse epistaxis; and she showed a disposition to purpura on her legs. Both disappeared under the use of the iron in combination with purgatives.

Epistaxis is a symptom of not uncommon occurrence in renal disease. According to my experience, it belongs more especially to the chronic wasting and contracting kidney, rather than to the other forms; and it appears to mark an advanced stage of the disease, when the blood has been much injured in quality, and the eliminating power of the kidneys for organic matters has been much diminished.

This woman exhibited, for a considerable time

after her admission into the hospital, a very oppressed state of breathing, and a marked tendency to coma. Both these states were due to one and the same cause—viz., a poisoned state of blood, disturbing the nutrition, and deranging the functions of the respective organs of respiration and of the consciousness. The disturbance in the lungs assumed a more serious form than that in the brain, owing, doubtless, to their exposure to other morbific influences—cold air, irritating matters in the air, and also to the accumulation of fluids secreted in increased quantities, by the mucous membrane of the air-passages, under the influence of noxious blood. This is, as I believe, the true pathology of the so-called *renal bronchitis*, which is apt to occur in the acute affections of the kidney as well as the chronic, as in the acute renal dropsy after exposure to cold and after scarlet fever. We find an analogous condition of lungs from poisoned blood in typhus fever; a state which still less deserves the name of *bronchitis* than that from diseased kidney. In pyæmia, too, a similar affection occurs.

The organic disturbance of the brain which accompanies and causes the comatose tendency is, as I have already remarked, much less than the pulmonary affection. There we find nothing which the most zealous morbid anatomist could call inflammation; and, except the patient may have died in convulsions, we do not even find conges-

tion—that most fertile of causes with a school of pathologists which is, I hope, fast disappearing. Indeed, the brain is generally anæmic; and the disturbed function consists in an almost paralytic condition of the cerebral hemispheres (the centre of consciousness and intellectual action), from impoverished and depraved nutrition. Sometimes, as you know, this depraved nutrition will give rise to epileptic convulsions; and sometimes one or more of the small and weakened vessels will give way, and a true apoplectic coma will be established.

The existence of the comatose tendency is another point in favour of the diagnosis which I have given. For this symptom is much more prone to occur as a consequence of the contracted kidney than in any other form of renal disease. The peculiar state of nutrition which induces the constant state of waste with wholly disproportioned renewal, is unfavourable to the elimination of the organic matters peculiar to the urinary secretion. And it is the accumulation of these matters in the blood which favours the development of coma and other derangements of brain-function.

That you might judge how imperfectly the kidneys acted in this case, I requested Dr. Conway Evans to make a careful analysis of this woman's urine; and I shall now give you the details of it. The quantity of urine which the

patient usually passes in the twenty-four hours is about forty ounces; and on the day on which it was analysed, the whole amount secreted, from ten o'clock one morning until the same hour the following morning, was collected and mixed together, and a portion of the entire quantity submitted to examination. The following were the results obtained:—

Urine in 24 Hours.

Water . 17129·016 grs.

Solid matter	531·984	Organic matter	435·555grs.
		Fixed salts .	96·429
Non-albuminous solids.	399·121		

Albumen	132·863 grs.
Urea	104·994
Extractive, uric acid, ammoniacal salts, &c.	197·698
Alkaline salts	87·334
Earthy salts	9·095
Chloride of sodium	30·800
Sulphuric acid	17·837
Phosphoric acid	15·930

Now, taking the amount of solid matter ordinarily excreted by the kidneys of a healthy adult in the twenty-four hours at about 650 grains, or in the case of a female, particularly when deprived of exercise, at considerably less than this—say 550 or 580 grains—it appears from this analysis, that the quantity of solid materials eliminated by this patient's kidneys in the same

period is not so very much below the normal standard. But, upon further examination, you will find that of the 532 grains of solid matter excreted in the urine of this patient, nearly 133 grains consist of albumen; thus reducing the *non-albuminous solids* to rather less than 400 grains. And, if you look still further into the analysis, you will find that the amount of urea thrown out of the body daily, instead of being about 240 or 250 grains, is barely 105 grains: thus showing very clearly, I think, that one of the most striking features in these cases is the deficient excretion of urea and other urinary solids.

Had an analysis been made of the blood in this case, there can be no doubt that we should have found a notable quantity of urea in it, and we might have thus accounted for, at least, a portion of that which ought to have appeared in the urine. Some years ago there was in the hospital a man named Armstrong, 40 years of age (vol. xxix. p. 72), who had well-marked symptoms of contracted kidney, complicated with imperfect mitral valve, and a weak and dilated heart. Owing to this complication, and the consequently enfeebled capillary circulation, the albumen in the urine was more abundant and the dropsy greater than usual. This patient died comatose, and the post-mortem inspection revealed contracted kidneys with numerous cysts. In this case urea was

found in the blood, and also in the serum obtained from a blister. Dr. Beale, who made the examination, reported that he obtained from half an ounce of the blister-serum ·54 gr. of urea. He also detected it in considerable quantity in the brain.

In the very general sketch which, in this and the preceding lecture, I have attempted to draw of the various affections of the kidney which give rise to albuminous urine, and likewise very frequently to dropsy, it has been my aim to bring under your notice chiefly such points as best deserve your attention in clinical investigation, and to aid in an accurate diagnosis. It is quite beside my purpose to attempt any pathological discussion, although a more fruitful source of such discussion could scarcely be found. Let it be enough for you at present clearly to understand the clinical history and the morbid anatomy of these affections, and to watch the results of treatment.

Before we part, I must ask you to look through the several microscopes which are arranged on the table, under which are placed specimens of the various kinds of tube-casts which indicate these morbid conditions of the kidneys. Under this microscope, for instance, are placed *epithelial casts* and scattered *renal epithelial cells*, such as are often met with in the acute forms of renal dropsy; as in that which

follows scarlet fever, and in that which sometimes results from exposure to wet and cold. Here you will see *granular casts*, with a few *waxy casts*, such as are generally found in the urine in that form of chronic renal disease which ultimately produces wasting and shrinking of the kidneys, and from which, I believe, the patient who has occupied so much of our attention to-day is suffering. Under these two microscopes, you will see *tube-casts* which occur in the urine in those cases of that form of chronic disease which tends to the permanent enlargement of the kidneys, rendering them either *fatty* or *waxy*. Here are *fatty casts* and *cells;* and here are what are termed *large waxy casts*. I use the nomenclature of Dr. Johnson.

Here, again, are tube-casts which may occur in the urine under a variety of circumstances; whenever, in fact, severe hæmorrhage takes place in the kidney. These are *blood-casts;* and they frequently result from a poisoned state of blood, which, as I just now remarked, may be produced by very different causes. An instance in which these casts were recently (only last week) detected in the urine, was that of an old man in Rose ward, whom most of you must recollect, and who was labouring under chronic bronchitis and emphysematous disease of the lungs. In this case the impediment to the breathing was so extreme, that it led to such great congestion of the kidneys

as to produce rupture of certain of the Malpighian capillaries, and thus gave rise to the formation of *blood-casts*, such as you see under this microscope.*

In conclusion, let me caution you to keep in view the complications which are apt to accompany these renal diseases, and which more or less interfere with the development of the phenomena as I have explained them. Of these complications, diseased or weakened heart is one of the most frequent as well as one of the most serious. Contracted liver is also an important complication, and tends to determine the dropsy to the peritoneum. No complication is in itself more distressing to the patient than bronchial irritation; by embarrassing the pulmonary circulation it tends to aggravate the dropsy, and by favouring congestion to increase the albumen. The existence of any or all of these complications tends to increase the difficulty of the diagnosis, by destroying the clearness of the line of demarcation, as regards clinical features, between the several forms of renal disease, which give rise to albuminous urine and to dropsy. Much of the difficulty of the diagnosis of the case which we have had under

* For a fuller account of these various microscopic objects I refer to Dr. Johnson's book, and also to Dr. Beale's work on the Microscope as applied to Clinical Medicine.

consideration is due to its complications with heart and bronchial affection, and with some degree of hepatic disease. They have induced a much greater amount of dropsy and much more albumen in the urine than are found in uncomplicated cases of contracted kidney.

LECTURE V.

On Dropsy.

In my lecture of to-day, gentlemen, I shall make some remarks on the general doctrines of dropsy. This subject is naturally suggested by our having had under observation for some time past in the hospital many cases of dropsy, from various causes. Thus we have, and have had, many examples of dropsy after scarlet fever, of which there has lately (1848) been a considerable epidemic. There have, also, been two cases of ascites connected with diseased liver: of these patients, one has, within the last day or two, left the hospital improved; the other is still here, but he goes out in a few days, all his dropsy having disappeared. We have likewise under treatment a well-marked example of universal anasarca, commonly called *acute* or *inflammatory dropsy*, which is very nearly allied to the dropsy which follows scarlet fever; and within the last two or three days, a woman has been admitted with dropsy of the lower extremities, and, in a less degree, of the upper extremities and face also, which conditions are associated with distinct indications of some cardiac disease.

These are examples of the principal typical

forms of dropsy. I propose, in this and some following lectures, to examine the pathology and treatment of this morbid condition, and to avail myself of these and such other illustrations as may hereafter arise.

You are, doubtless, aware that dropsy is but a symptom, an indication of a disturbed state of the circulation—such as permits a portion of the serum of the blood, or of the liquor sanguinis—very frequently, if not, indeed, most frequently, the latter—to transude through the parietes of the small blood-vessels, and thus to escape into some serous sac, or into the areolar tissue, according to the situation and nature of the disturbing cause.

The simplest form of dropsy may be described as that which accompanies local derangements of the circulation. Women of weak constitution, whose tissues are lax and muscles flabby, and whose blood is probably deficient in some of its essential principles, or more watery than it ought to be, are prone to have swelled legs after standing or walking; the subcutaneous areolar tissue about the ankles becomes puffy and swollen, and pits on pressure; and this condition is always aggravated towards the close of the day. In such instances, the erect posture deranges the circulation of the legs and ankles; an effect which may be produced in strong persons by a very long continuance of the same cause.

A bandage applied too tightly, if left on for a

sufficient time, will produce a swollen and dilated state of the veins below the point of application, and ultimately œdema and dropsy of the areolar tissue (anasarca) below the line of pressure of the ligature. The derangement of circulation which gives rise to this dropsy, is a retarded return of the blood through the veins of the part, occasioned by the pressure of the bandage; the blood accumulates in the capillaries, which are, to a certain extent, relieved by the transudation of its liquid portion through their parietes into the interspaces of the surrounding areolar tissue.

When the general nutrition of any member or organ of the body is materially depressed, dropsy may ensue in it. You have frequent opportunities of observing an illustration of this fact in the anasarcous condition into which paralytic limbs are apt to fall. The limb which has suffered most in its nervous power, is in general that which exhibits the greatest amount of dropsy. Hence, in the hemiplegic paralysis, especially in that of old persons, you often find the upper extremity anasarcous, but the lower not at all so. The occurrence and amount of dropsy, in either, will be very much promoted by the limb being kept in a dependent position; indeed, a limb, thus enfeebled in its circulation and nutrition, may be made dropsical in a few hours, by being allowed to hang down, or kept otherwise below the level of the body. In such cases, the circulation is at

fault, in consequence of the weakening of the proper forces of that portion of it which passes through capillary vessels. This is manifest from other phenomena which occur in these limbs, such as the wasting and flabbiness of the muscles, the softness and pallor of the skin, and the failure in the heat-producing function, which leaves these limbs almost always colder than the others.

To a similar enfeebled condition of the capillary circulation may be referred the congested and anasarcous state of the dependent parts of internal organs in low diseases, such as the posterior parts of the lungs in typhus or other analogous maladies.

In phlegmonous and erysipelatous inflammations of the skin and subjacent tissue, we find a state of œdema affecting the inflamed tissue, and also extending a greater or less distance around it. This is a form of dropsy caused by an effusion of serum or of liquor sanguinis into the areolar tissue; and this fluid can find its way thither in no other way than by filtration through the parietes of the blood-vessels. Examine carefully a patient labouring under erysipelas of the face, and you will find that the swelling is entirely due to the state of the subcutaneous tissue; and, in those parts in which the erysipelatous redness has not yet fully developed itself, that there is, nevertheless, swelling, and that the skin on pressure gives a doughy feel, and pits: the redness depends on the inflammation affecting the true skin, the

swelling on the dropsy of the areolar tissue. This œdema or dropsy originates, likewise, in a disturbed state of the capillary circulation. But the disturbance is essentially different from that which occasions the form of anasarca to which I last alluded; in the former the forces of the capillary circulation are weakened, in the latter these forces are exalted—the blood is attracted to the skin and areolar tissue in increased force and quantity—and the same cause which gives rise to the increased redness, likewise produces the œdema.

In like manner, when blood is determined in an unusual degree to certain membranous surfaces, dropsical effusions are apt to take place into the sacs which these membranes enclose; hence the accumulations of serum or of liquor sanguinis which so often occur in the sacs of serous membranes after pleurisy, pericarditis, or peritonitis. It forms an interesting topic of inquiry and discussion, why these effusions should take place after some pleurisies, &c., and not after others,—why some pleurisies will afford no other effusion, save that of a small quantity of liquor sanguinis, yielding more or less of plastic lymph, while others will pour out—and that in a very short time—a sufficient quantity of fluid to fill the chest and compress the lung. I dare not digress into this interesting and important field of inquiry, but must content myself with stating my belief that

the proneness to liquid effusion in the one case, and the absence of it in the other, is due to a difference in the physical constitution of the blood, which in the latter instance is more liquid, and contains a larger amount of water, and less fibrin, albumen, and red corpuscles, than natural; while in the former case the blood is either normal in its constitution, or contains an excess of fibrin. And I cannot forbear the expression of my opinion, that the mode of treatment used in these serous inflammations exercises a decided influence upon the occurrence or non-occurrence of such effusions, and that the practice of bleeding—especially of venesection—contributes much to the production of them. I can certainly state that, in cases of pleurisy, thoracic effusions have been of rare occurrence of late years in my own practice; and I can only explain it by the fact, that I have, to a great extent, abandoned the mode of treating these inflammations by large sanguineous depletions, and now content myself with adopting other means, which, although less showy and less bold, are much safer, and less trying to the patient, and ultimately more satisfactory both to him and his physician. It is to *large* venesection that I object; and, indeed, my experience enables me to express the opinion that general bloodletting is unnecessary, and therefore superfluous, in most cases of pleurisy. If blood is to be taken away at all, let it be done locally, by the

application of leeches, or, what is still better, by cupping, which, for the relief of pain or dyspnœa, may be sometimes used with advantage.

You observe I make use of the expression "blood determined to a part." This is a phrase much employed by medical men, and one which I think we may continue to use without disadvantage. It implies that the blood-vessels of a part obtain more than their usual share of blood, but expresses nothing as to the cause or the mechanism of the determination. Undoubtedly, local determinations may arise from very different causes, and by very different kinds of mechanism. The problem, "Why a particle of dust adhering to the conjunctiva makes and keeps the conjunctiva as red as velvet," has not yet received a clear and definite solution. My own belief upon the point is, that local determination such as this —due clearly to the presence of some irritating agent, whether in the blood-vessels, or external to them—cannot be satisfactorily explained without assuming the existence of a force which operates directly upon the blood in the capillaries,—a *vis à fronte*, which, by its attractive power, assists and regulates, by distributing in due proportion, the *vis à tergo* of the heart. An enfeebled condition of this force, and an augmented power of it, may equally tend to the production of very similar phenomena, often to be readily detected by a practised eye, but which sometimes cannot

be distinguished except by experiment. Under both conditions you may have determination of blood, congestion, or hyperæmia: in the one case it will be a passive, in the other an active congestion; in both cases you will have dropsy, *i.e.* effusion of serum through the walls of the overcharged blood-vessels, and this dropsy will be in the one case active, in the other passive; though in both the proneness to dropsy will be favoured by the fluidity of the blood, its aqueous character, and the diminished amount of its red particles.

In addition to other instances of dropsy from local causes already referred to, I may mention the following, as illustrative of the fact that dropsies are the result of retardation of the circulation in some part of its course.

Swelled leg, from the adhesive form of venous inflammation, or what is called *phlegmasia dolens,* is dependent on a plugging-up of the femoral and other veins of the leg by the results of the phlebitis, whereby the circulation through the limb becomes more or less obstructed, and the flow through the capillaries is so delayed as to produce an œdematous state of the whole lower extremity. This is a condition very common in puerperal women, and it also occurs in men, sometimes after fever, sometimes from other causes. The researches of Dr. Davis, Dr. Robert Lee, and Mr. Arnott have given us the clue to the true pathology of these affections, and the explanation of the

physical conditions upon which the swelling depends.

Pressure on a venous trunk or trunks will cause dropsy on the distal side of the pressure. This was illustrated long ago by the well-known experiment of Lower. This celebrated anatomist and physiologist tied the jugular vein of a dog, and found that the areolar tissue of the head and neck became enormously distended with serous effusion. Andral gives a case of dropsy of the peritoneum—ascites—caused by a tumour pressing on the vena portæ; the liver in this case was healthy, and the mechanical obstruction produced by the tumour was the sole cause of the effusion. Dr. Watson, in an admirable Essay on Dropsy communicated by him to the Library of Medicine (which I recommend to your perusal), mentions a case of dropsy of the upper half of the body, which was occasioned by an aneurysm pressing on the vena cava superior, the lower half of the body having been free from all effusion.

A good example of this form of dropsy occurred in this hospital, and I shall refer to it more particularly, not only as a good illustration of the production of dropsy by pressure on a venous trunk, but also to show you how a knowledge of this fact afforded material assistance in forming a correct diagnosis.

Case XVII.—The patient, a man of 43 years

of age, was admitted for an anasarcous state of the right upper extremity, with a similar condition of the left, although to a much less degree. The neck and face were very much swollen and puffy, and their veins large and distended with blood; and these phenomena were more developed on the right side than on the left.

There was no dropsy elsewhere; the lower extremities, which would have been involved had the dropsy been cardiac, were quite free from swelling.

The marked enlargement of the veins of the neck, and of the upper extremities, especially on the right side, and the absence of any such enlargement in the veins of the lower part of the body, pointed to some obstacle to the return of the blood from the upper part of the body to the heart.

If this obstruction had existed in the heart itself, it would have affected the veins of the lower half of the trunk to a greater or less degree. These, however, were intact. If, moreover, it had existed in the right vena innominata, the right side of the neck and right upper extremity would alone have suffered; but although they were the parts chiefly swollen, the left were also involved. The obstacle must, therefore, have been such as would involve the superior vena cava, affecting, at the same time, but to a slighter degree, the right vena innominata.

Another point in this case aided in indicating the locality of the obstruction. The right lung was evidently much congested and the source of a pulmonary hæmorrhage, the left lung being in a perfectly natural state. As there were no signs of any cardiac disease which could explain this phenomenon, it was interpretated as indicative of pressure on the right pulmonary veins by the same cause as that which produced pressure on the vena cava. The passage of the air into the right lung was obviously much impeded, and, no doubt, by a similar compression at or near its root.

These and other signs led to the diagnosis that the phenomena depended on the presence of a tumour near the right vena innominata and the root of the right lung, compressing that vein, the bronchial tube, and the pulmonary veins. The post-mortem examination showed that an aneurysm, about the size of an orange, sprang from the posterior part of the ascending aorta just above the sinuses of Valsalva. The superior vena cava was embedded in the right wall of this tumor, and the right pulmonary veins and bronchi were compressed by it.*

Hydrocele is no doubt due to some local dis-

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* For a detailed account of this case, the reader is referred to a Clinical Lecture published in the *Medical Times* of Jan. 13, 1855.

turbance in the circulation of the spermatic veins, caused probably by disease of their tunics.

There are some interesting cases mentioned by Tonnellé, of extensive arachnoid effusion from obliteration of the sinuses. Several cases of intra-ventricular effusion, brought on by pressure on the venæ magnæ Galeni at their exit from the third ventricle of the brain have come under my observation, and I am disposed to think that a large number of the cases of water in the brain in children, which are associated with a strumous diathesis, are due to an impediment to the circulation through these veins in some part of their course. All these are very good examples to show how the local retardation of the circulation may produce dropsy; the amount of the dropsy varying with the extent of the circulation upon which the obstructing cause exercises its influence.

Those cases of dropsy of the peritoneum, or ascites, which occur independently of inflammation of that membrane, and which are by far the most numerous, are due to retarded circulation through some part of the portal system of veins, either of its intestinal part, its trunks, or its hepatic ramifications. It is when these last vessels are impeded, that ascites occurs in the most decided manner; and the dropsy is most abundant when the impediment to the portal circulation is most complete. Hence the small

contracted livers produce the largest amount of dropsy; the large and hard liver causes the next greatest quantity of effusion; and the livers which are enlarged from cancerous or other deposits, creating partial obstructions here and there, will produce a still less degree of peritoneal dropsy. The pressure of a large spleen, of a peritoneal tumour, of cancerous glands, or of an enlarged pancreas, may likewise give rise to ascites.

Cardiac Dropsy.—To the category of dropsy from obstructed circulation must be referred all effusions that appear to result from enfeebled or deranged circulation through the heart, or what is specially called cardiac dropsy. This may arise, first, from *simple weakness* of the heart, as in cases where the nutrition of the whole body is languid, and the heart shares in the general weakness of the muscular system. You may often see, as an accompaniment to this condition, and not unfrequently indeed as its cause, a watery state of the blood; and this very nature of the blood favours that transudation of which its tardy circulation is the immediate exciting cause. The disturbance of the circulation falls most heavily upon the returning portion of the blood—that which moves with least force, and by which the *vis à tergo* is most feebly felt, *i. e.* the circulation in the veins. Whatever may be the cause of inefficient circulation through the

heart, the veins and capillaries are sure to feel it most, because in them the blood moves most sluggishly, and under least pressure from behind; and it is, therefore, these parts of the circulating system which are most amenable to obstructing causes.

The most common form of cardiac dropsy arises from a physical obstruction in some part of the heart's mechanism.

Suppose the obstruction to be situate at the aortic orifice, the problem is to explain how this will cause dropsy. At the early periods of such an obstruction, the excited nervous and muscular energy of the heart is sufficient to master it, and to drive the blood with its wonted force through the various channels of the circulation. By-and-bye this exaltation of these vital forces no longer suffices, and, notwithstanding that the wall of the left ventricle may have acquired increased thickness, there is evidence in its state of dilatation that the backward pressure of the blood, under the influence of the obstruction, has been gradually increasing to a degree which the contracting force of the ventricle is unable fully to counterpoise; hence the yielding of the ventricular wall, and the gradual augmentation of the ventricular cavity.

But soon this great backward pressure ceases to spend itself on the ventricle alone; the outflowing blood from the auricle now encounters the

obstacle, and is retarded in its course by it. Thus pressed back, it excites the auricle to greater muscular efforts, and gradually creates more or less of dilatation of its cavity. Ere long the influx of blood into the auricle feels the obstacle, and the pulmonary circulation begins to encounter difficulty. To overcome this, the right ventricle is exerted to increased efforts; but it too passes through the same series of changes as the left ventricle, its walls acquiring increased thickness, and its cavity gradually becoming dilated.

This state of dilatation at length extends to the auriculo-ventricular aperture and to the right auricle. The valves of the former (the tricuspid valves), never perhaps very perfect as counteracting the reflux from ventricle to auricle, and not enlarging in proportion to the dilatation of the aperture, become quite insufficient for their office, and allow of free regurgitation of blood into the auricle.

A new obstacle is thus set up to the onward flow of the venous blood. At every systole of the ventricle a backward wave is established, which the inflowing blood from the veins has to encounter. For a time this does no more than keep the veins near the heart—the innominate and subclavian veins, and the jugulars—in a distended state; but ere long the backward wave sensibly influences the current in them, and venous pulsation is established. This regurgitant

venous pulsation is a certain index of a considerably dilated state of the right cavities of the heart, and of imperfection of the tricuspid valves.

The occurrence of this direct and decided obstacle to the return of the venous blood is the signal for the more or less rapid development of dropsy, if, indeed, this symptom have not already shown itself.* The dropsy begins in the feet and ankles—parts which are most dependent—and gradually creeps up, affecting the thighs, penis, and scrotum, which become swelled to an enormous extent, and ultimately the abdominal integuments, the face, and the upper extremities. The obstacle to the return of the venous blood to the right auricle, throws it back upon the hepatic veins; the result of which is, that often, in but a very few days, the liver acquires a great increase of size, which appears to be due to the immense accumulation of blood in it.

Such is the sequence of phenomena which usher in dropsy when the circulation is obstructed as it flows from the heart. The cardiac circulation may, however, be otherwise obstructed than at the aortic orifice. Thus, the cardiac obstruction may be due to disease of the mitral valves; and it matters not what the nature of the mitral lesion, whether it permit regurgitation from ventricle to

* Loveland, xxvi. 1849, 179—201.

auricle, or whether it create direct obstruction to the flow of blood from narrowing of the mitral chink. In either case the blood flows with difficulty, and against a greater or less opposing force from the auricle to the ventricle. The obstruction is immediately felt by the pulmonary circulation and by the right ventricle, and so also by the right auricle and the systemic veins.

Again, you may have the left side of the heart quite free from disease, and the obstruction may be in the pulmonary circulation. We have many opportunities of witnessing this in cases of asthma, or of chronic bronchitis of long standing. In these cases, the lungs become emphysematous, the air-cells are dilated, their walls stretched, the capillary network upon them altered in form and partly obliterated. The result of all this is an impeded capillary circulation through the lungs, requiring for its maintenance increased exertions on the part of the right ventricle. Out of these increased efforts, and the great backward pressure on the wall of the ventricle, arise the hypertrophy and dilatation which it soon exhibits, the impediment to the systemic venous circulation, and the dropsy.

It may be laid down that, except under some peculiar condition of the blood, dropsy will not develop itself in effect of cardiac disease, unless the right auriculo-ventricular opening and the right auricle be so dilated as to offer a decided

impediment, through regurgitation, to the flow of the venous blood into the heart.*

And it may also be stated, as a rule pretty general in its application, that the nearer the cardiac lesion is to the right side of the heart, the more likely is dropsy to appear, so far as regards lesions of like nature. Thus dropsy will more slowly follow an obstruction in the aorta or the aortic orifice than one at the mitral orifice, or affecting the pulmonary artery. In mitral disease there is one link less in the chain which connects the obstruction and the right cavities than in aortic disease; and in obstruction of the pulmonary artery, there are two links less.

Renal Dropsy.—There is yet another form of dropsy, arising partly from an altered state of blood, and partly from impaired force of the capillary circulation throughout the body, the circulation in the kidney being that primarily deranged. This form of dropsy is general. It affects the areolar tissue everywhere, developes itself rapidly, and is not influenced by position in the marked way in which cardiac dropsy is. It very often

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* Dr. Blakiston's remarks on this subject in the 11th chapter of his very practical book *On Chest Diseases*, deserve attentive perusal.

appears first in the least dependent parts, as in the face and eyelids; sometimes it shows itself in the upper parts of the body simultaneously with the lower. The face and eyelids are often among the earliest parts in which the dropsical swelling occurs.

This form of dropsy is often described as general dropsy, or acute dropsy, and as such attracted the attention, many years ago, of Blackall and others. More correctly, perhaps, it may be termed *acute renal dropsy,* from its rapid supervention and its constant association with an acute affection of the kidney.

We need not wonder that a deranged and a more or less obstructed state of the circulation through the kidneys should cause dropsy. A large portion of the blood of the descending aorta must pass, in an incredibly short time, through the complicated circulation of these organs, where it has to traverse two distinct capillary systems. The short and wide renal arteries are at but a trifling distance from the aortic orifice, and any serious impediment encountered at the kidneys, more especially if quickly developed, would soon react upon the heart and upon the whole circulation.

The dropsy after scarlet fever belongs to this category of *acute renal* dropsy. And, as it is of very frequent occurrence, and exhibits the clinical features of the disease in a very exquisite manner, I propose to take it as typical of this kind of

dropsy. We are at no loss to illustrate it, especially in cold seasons when an epidemic of scarlet fever has existed.

Not to carry this lecture beyond proper bounds, I shall resume the subject of dropsy after scarlet fever when we next meet.

LECTURE VI.

On Dropsy after Scarlet Fever.

THE present, gentlemen, is a convenient time to make some remarks on the dropsy which frequently follows scarlet fever; inasmuch as we have lately had a considerable number of cases of this affection in the hospital. Although it seldom happens that any one who keeps up a regular attendance in the wards fails to see at least half-a-dozen sufficiently well-marked examples of this disease during the winter session, still we rarely have as many as this number in the house at any one time. The malady is very rife this winter, there being just now a prevailing epidemic of scarlet fever, in consequence, probably, of the extreme coldness of the season—for this has been one of the most severe winters that we have had in this country for several years, and a low temperature is one of the conditions most favourable to the development of this disease.

Many of you are, no doubt, well aware how this affection comes on: nevertheless, for the benefit of those who are not quite *au fait* on this subject, I will briefly describe its usual course. A person gets scarlet fever—that is to say, the poison

of scarlet fever in some way or other enters the system; sore throat comes on; and then the rash makes it appearance over the body. The latter soon disappears, and a process of desquamation takes place, the whole occurring in the space of about ten days, and from this time until about the twenty-first day the patient becomes convalescent; but if the urine be daily examined during this period, it will very often be found, at some time between the fourteenth and twenty-first day, to present certain appearances which are characteristic of irritation in the kidneys.* These indications of renal irritation may disappear, and the patient may get perfectly well; but, on the other hand, they may increase, and general dropsy will supervene—a dropsy so general as to involve the whole of the subcutaneous areolar tissue, and very often the peritoneum, and sometimes the pleura or pericardium, or the areolar tissue of the lungs. The condition of urine to which I allude consists in the presence in that fluid of certain *fibri-*

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* Mr. Tripe, in an able statistical analysis on scarlatinal dropsy, makes out that the fourteenth day from the commencement of the fever is that on which the dropsy most frequently comes on, and that the other days on which its invasion occurs most frequently are the twenty-first, the twelfth, and the seventh, the relative frequency being in this order, and then the thirteenth, eighteenth and twentieth.—*Brit. and For. Med. Chir. Review*, No. xxvii., p. 214, 1854.

nous moulds or *casts* of the uriniferous tubules, together with an undue quantity of renal epithelium, the latter being shed, probably, by a process somewhat analogous to the desquamation of the cuticle. These casts and epithelial cells may be readily seen on a microscopical examination of the urine; but chemistry also affords us aid in this matter, for the usual tests of heat and nitric acid will show that the urine contains more or less albumen. Frequently, too, the urine of patients in this condition assumes more or less of a smoky hue, which either depends upon the presence of blood, or, what as commonly happens, upon that of great numbers of minute crystals of uric acid. To which of these causes the smoky appearance is due, the microscope will readily determine: in the one case, blood-corpuscles will be seen; in the other, orange-coloured, more or less rhomboidal crystals of uric acid, or, as not unfrequently occurs, both blood-corpuscles and uric acid crystals may be present in considerable quantity. The urine usually continues to exhibit these appearances for some days; the amount of albumen increases; and, at length, a dropsical state of the areolar tissue generally manifests itself. This œdematous condition usually appears first in the face and eyelids, but it soon involves the lower extremities and the abdominal cavity. The amount of the dropsy in these cases will always, I believe, be found to be in inverse proportion to the amount of colouring mat-

the brain, or, more likely than either, a poisoned state of brain from impure and poor blood; for, during the first two or three days after he came in, he was very drowsy and lethargic, as if under the influence of some narcotic. His urine was deficient in quantity, smoky in colour, and it showed a great abundance of albumen on the application of the appropriate tests.

Now let us see in what way this case presented those three conditions, the concurrence of which I have just now stated to be necessary to the production of this form of dropsy.

1. The *skin* was dry, rough, and harsh, and it seemed as if in an irritated state: but this irritation was not extreme. It would have been better, I think, if it had been more irritated, as such a condition would probably have enabled the patient to have thrown off more completely by cutaneous elimination the morbid poison; for it is a known fact that the dropsy generally occurs in the mildest forms of scarlet fever, in which there has been little or no eruption; but in those cases in which the eruption has come out well, and the desquamation has consequently been excessive, it is much less likely to occur, except under the influence of a strongly exciting cause, such as prolonged exposure to cold.

2. The *kidney* presented an analogous condition to that of the skin; as there has been a desquamative state of the one, so there probably is a

similar condition of the other. When we examine the kidneys in these cases (and now, thanks to recent researches, of which those of our friend, Dr. Geo. Johnson, are among the first both in time and importance, we have a very exact knowledge of its precise anatomical condition in this form of disease), we find the renal tubes filled with epithelium, and the whole organ enlarged, and in a state of hyperæmia, so far as this great filling of the uriniferous tubes will permit it to be so. Not only is there a large quantity of blood in the organ, from the undue attraction of that fluid to it by reason of its irritated state, but also the blood is irregularly distributed in it. The principal anatomical change in the kidney results from the development of an undue quantity of epithelium in the uriniferous tubes.

The accumulation of epithelium creates an unnatural distension of the tubes, and the circulation in the small vessels which ramify upon their walls (forming the portal vessels of the kidney) becomes impeded. Thus the blood is not only strongly attracted to the Malpighian bodies, but it also finds its way out of them with difficulty; no wonder, then, that great congestion of these bodies should take place. From this over-filling of the Malpighian capillaries there results an escape of serum into the uriniferous tubes, and from the rupture of many of these minute vessels, the red particles, in greater or less quantity, pass into the

urine; but little urine is secreted; and this imperfect elimination of water is negatively a further cause for the accumulation of epithelial particles in the uriniferous tubes, inasmuch as less fluid percolates the tubes to wash them out.

The congestion of the Malpighian bodies, when it exists to a certain amount, produces effusion of liquor sanguinis into the tubes; but when it occurs to a still greater degree, it leads to rupture of the Malpighian vessels, and the escape of *all* the constituents of the blood: in the former case, the urine is merely albuminous; in the latter, in addition to albumen, we find in it an abundance of blood-corpuscles, and fibrinous casts of the uriniferous tubes, from the fibrin having moulded itself to their walls in the process of coagulation. This is the state of the kidney; and accompanying it we find almost always that peculiar and very characteristic smoky condition of the urine, which I have already described.

3. The *blood.*—What is the condition of the blood? Whoever looks at our patient, and, indeed, at all patients labouring under this form of dropsy, will see at a glance that there is every indication of a great want of red particles, and of a too watery condition of the blood. The best analysis of the blood in scarlet fever shows that no material change takes place in the proportions of the several staminal principles in the early stages of the disease. But, as the disease advances, the red

particles suffer a rapid diminution, and sometimes fall to as low as one-third their normal amount. At the same time the specific gravity of the serum diminishes considerably, and the albumen of the serum also falls very much in quantity. Several observers notice also the presence of urea in the blood in these cases. This state of blood is clearly favourable to the transudation of its liquor sanguinis through the parietes of the blood-vessels; and unfavourable to those changes on which the maintenance of a normal state of the vital fluid depends. From the probable deficiency in the nutrient changes in the blood itself, there is doubtless more attraction from the blood *to* the tissues (*exosmose*) than from the latter to the former (*endosmose*). This excess of current out of the canal of the blood-vessels to the surrounding areolar tissue would favour greatly the production of a state of anasarca and general dropsy.

These facts will, I think, lead us to form something like a theory of the mode of formation of this dropsy. What we have got to explain is this, that to-day a child may be going on very well, and to all appearance in a favourable convalescence, and in a few days afterwards may rapidly become universally œdematous, with effusions to a greater or less extent into the various serous cavities, accompanied by scanty urine, smoky in colour, and albuminous; in fact, exhibiting all the appearances I have already described. If you

look to the three conditions which I just now mentioned, you will, I think, get a satisfactory explanation of these phenomena.

First.—From some cause not easy of detection, but in some instances undoubtedly from exposure to cold or wet, there is an arrest to the proper elimination of the scarlet fever poison through the skin, its usual emunctory, and the ordinary excretion of water through that organ is checked; not obtaining complete egress there, the poison finds for itself another channel, and is thrown on the kidneys. Its passage through these organs produces great irritation in them, the effect of which is, that water is imperfectly eliminated, and thus the escape of water from the blood is prevented through its two ordinary channels—namely, the skin, which is *an* emunctory of it, and the kidney, which is, *par excellence, the* emunctory of it.

Secondly.—As a direct consequence of this obstruction to the escape of water through its two principal channels, a watery condition of the blood is induced. It is calculated that we get rid of three pints of water in a day, by the secretion of the kidneys, and by cutaneous perspiration, and this is certainly not too high an estimate. Now this water must be got rid of in some way or other, and when its usual channel of escape is cut off, it is very apt to permeate the parietes of the blood-vessels. But why do we find it particularly in the areolar tissue, and why in that of the

skin more than any other part? It finds its way into the areolar tissue of the skin, in consequence of the determination of blood to that integument, caused by its state of irritation; for in order to reach the skin the blood must pass through the subcutaneous areolar tissue. It would be wrong, however, to suppose that the effusion is always confined to the neighbourhood of the skin; we find it in the areolar tissue of the lungs, and in the serous cavities; in the former, because of the necessarily large flow of blood to the lungs; and in the latter situation, because of the extreme tenuity of the tissue of the serous membranes, which affords but the slightest obstacle to the escape of the serous part of the blood.

Thirdly.—All this is favoured by the impoverished state of the blood. If the scarlet fever poison be not eliminated, it interferes with the proper nutrient changes which take place in the blood; and this is shown by the imperfect development of the red particles. The poison of scarlet fever appears to me to interfere with the formation of this important element of the blood, in the same way as that of rheumatism does, and other poisons likewise, inorganic, as well as animal—as, for instance, lead. This impoverished state of the blood undoubtedly materially affects the proper rate and vigour of the capillary circulation. That force of attraction to which I have already referred —the capillary force, or *vis à fronte*—cannot be so

vigorous when the blood is deficient in all or nearly all its solid ingredients, as when that fluid is healthy. It is not improbable, likewise, that there may be some special chemical condition of the blood in these cases. Magendie and Poiseuille found that the introduction of alkalies into the blood occasioned a great retardation of the circulation through the capillaries, and consequent dropsical effusion: what the precise condition of the blood is in scarlatina has yet to be shown; at present we can only conjecture that some such abnormal state of it does exist; that is to say, that, besides containing too much water, and too little colouring matter, it contains some special chemical agent likewise, which interferes with its proper vital changes.

Such is my theory of the dropsy after scarlet fever. What may be the ultimate fate of it upon a larger induction of facts, I will not attempt to predict. I offer it to you now, as a convenient mode of connecting the various phenomena which accompany, and doubtless tend to the production of, the dropsy.

Treatment.—As you have in this disease a more or less irritated state both of the skin and kidneys, the first and chief indication for treatment is to allay that irritation. Now, for this purpose, I know no more valuable or efficient remedy than the warm bath; indeed, I would pronounce it *the* most valuable single remedy for this state of

dropsy. You must use it frequently, bearing in mind, however, that both the disease and the remedy have a depressing tendency. You will be careful, therefore, not to use it oftener than your patient's strength will bear: most patients can bear it once a day for a few days: sometimes, however, you may give it twice in a day; but often you must not venture even upon the daily use of it. You must also be careful not to use it at too high a temperature. From 90° to 96° Fahr. you will find quite hot enough. In cases where you apprehend the access of dropsy, you may often succeed in arresting it by the daily use of the warm bath during the period when desquamation is or ought to be taking place. The next most important remedy is purgatives, which, by their action on the intestinal mucous membrane, open a new emunctory for the elimination of water, and with it any poisonous ingredient dissolved or suspended in it. Jalap, calomel, scammony, the compound powder of jalap, singly, or variously combined, are very admissible for this purpose, or the saline purgatives. With these you may give some of the milder diuretics, which do not exercise any direct irritative action on the kidneys; such as the liquor ammoniæ acetatis, or the bitartrate of potass. The last, in small doses, you will find extremely valuable. If, after a treatment of this kind pursued for several days, you find that the kidneys refuse to act

properly, and that the urine is very smoky, you may take a little blood from the loins by leeches or cupping, to relieve the local congestion. I do not recommend you to do this early, during the more irritative stage of the renal affection, as you will generally find blood-letting at that time much less efficacious in diminishing congestion than at a later period. Take but little at a time, and rather repeat the blood-letting in small quantities, than take much at once. It very rarely happens, indeed, that patients labouring under this disease can spare much blood.

In pursuing this treatment, I pray of you to regard it not as antiphlogistic, but as calmative and eliminatory, soothing cutaneous and renal irritation, eliminating water by the bowels, the kidneys, and the skin. Whilst using these remedies you must always support your patient by nourishing food, and often you must stimulate: indeed, you will frequently find the most signal benefit derived from giving port wine. Do not, when you feel that your patient's strength needs it, be deterred from giving stimulants by the fear of exciting fresh irritation of the kidneys. Your best guide as to the propriety of continuing stimulants or any other food, is the facility with which your patient *digests* them. If they create flatulence, gastric distress, pain, or any other symptom referable to the stomach, you must diminish the quantity or stop the supplies altogether.

Sometimes in the course of this disease you have symptoms of head affection. These arise either from dropsy of the ventricles, or from poisoning of the brain by retained urea. Free counter-irritation immediately and extensively applied to the nucha or the scalp, is the best remedy; and generally speaking, bleeding, local or general, is inadmissible. Sinapisms, succeeded immediately by blisters, are most valuable remedies in these head affections.

The boy whose case has formed the text of this lecture was treated much in the way I have described. He came in on the 15th October, and I ordered him a daily warm bath, and mild purgatives. The next day I made a slight alteration by giving him a more drastic purge, in the shape of a dose of compound powder of jalap, which carried off an abundance of watery stools. The following day (18th) he passed a pint and a half of urine, and the dropsy had greatly diminished. The next day he passed two quarts of urine; and from this time it was wonderful with what rapidity and in what quantity the kidneys continued to secrete: this great diuresis is frequently to be noticed in this form of dropsy. On the 19th he passed 2½ quarts. Under these circumstances it is not surprising that the dropsy almost entirely disappeared. Still the urine retained a little smokiness of colour, indicating the escape of blood; and, with the view of checking

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this, and applying a remedy to his anæmia, I have given him a little citrate of iron, under which treatment he has been rapidly improving, and he is now nearly well.

This case affords a good example of the favourable termination of this malady, as well as of its course. Dropsy after scarlet fever is not a disease of very fatal tendency (although it often kills rapidly), more especially when the preceding fever has been treated mildly, and with due regard to preserving the powers of the patient. Furthermore, I should not, generally speaking, prognosticate any special liability of this, or other patients similarly affected, to renal disease hereafter. I know that some deservedly high authorities think otherwise; but it seems to me we need much more proof than has yet been offered, before we shall be justified in affirming that the state of kidney which follows scarlet fever predisposes either to the large fatty kidney of Bright, or to any of the other forms of chronic renal disease.

If a patient who has had scarlet fever passes over three or four weeks after the cutaneous desquamative process has fairly taken place, and if by that time there be no albumen in the urine, or other indications of an irritated state of the kidneys, you may generally regard that patient as tolerably secure from any attack of dropsy; but it is the safest practice, I think, not to pronounce a

decided opinion on this point until six or even eight weeks have elapsed, during which the patient has been pretty free from all the symptoms of scarlet fever.

We have had more cases of this affection in the hospital during the last few months than for a long time previously, and I attribute this, in great measure, to the extreme coldness of the season. Among these several have been fatal. I am, therefore, enabled to bring before you cases in which the symptoms leading to a fatal issue have been prominent, as well as those which have run a favourable course. You will thus be the better able to form a judgment as to the cause which determines either the fatal or the more prosperous issue.

The first of these fatal cases terminated very quickly, and its recital will, I think, serve to impress upon you the principal points in the clinical history of the disease when it passes to a fatal termination.

Case XIX.—The patient was a little boy, named Edward Scales, æt. 7 years (vol. xl. p. 145), who was admitted into Rose ward on November 5th, 1853. The following report of him was made by my clinical clerk, Mr. Bird:—" He had an attack of scarlet fever about a month before his admission; the disease, however, was very slight, the eruption being ill-defined, and the

febrile symptoms insignificant." Now this slight eruption is an important feature in the case, and one to which I should wish to call your special attention. Hereafter, in your own practice, you will be very likely to meet with similar cases. You will be asked to see a child, whom you will find pale, waxy, and swollen from universal dropsy. The parents will naturally be extremely anxious; they will, perhaps, tell you that the dropsy has been preceded by no illness whatever; but you will be well aware that this condition must arise from some cause, and in the majority of cases you will learn, by careful inquiry, that there has been some sore-throat a short time previously, or that the child has been in the way of scarlet fever, and, possibly, may have had that disease, although it has not passed through its early stages in the usual course. In short, in consequence of the poison having been determined mainly to the kidneys, no symptoms were manifested, until the irritation of these organs had been set up, and the general dropsy established.

As a good example of the dropsy supervening, where there was little or no primary fever, I may notice the case of a little boy, named Alfred Austen, æt. 8 years (vol. xl. p. 203), who was admitted into Rose ward on December 28th, 1853. In this child the affection came on just in the way I have described, the dropsical symptoms being the first that attracted notice. The report is this:—

"He was born in the city, and has lived in London all his life; his health was good, according to his mother's account, until they removed into Windsor-court, Strand, which, she says, is very damp. His present illness commenced with soreness of the eyes, drowsiness, and swelling of the belly, legs, and face, with puffiness of the eyelids." Upon inquiring further into the case, we found that "his brother and sister, both children, are in the same state as himself, and the former is not expected to live." Here, then, was evidence that all these children had been exposed to similar morbific influences, and that the disease which had resulted had not run its usual course, but had given rise to irritation of the kidneys and dropsy.

There is a remarkable unanimity between all practical observers and authors respecting one point connected with dropsy after scarlet fever, namely, that the dropsy is most apt to come on in those cases in which the cutaneous affection has been slightly or not at all developed. Still I should tell you that though authors agree on this point, there is some difference of opinion among physicians, as to whether the tendency to dropsy is greatest when the cutaneous desquamation has been greatest, or the reverse. My own experience would lead me to adopt the latter of these propositions, and to affirm that the more abundant the cuticular desquamation, the less likelihood is there of the occurrence of dropsy. Still both

propositions may be correct, and for this reason, that a large quantity of the poison of scarlet fever being imbibed, and the rash not having been produced, yet cutaneous desquamation may take place, and renal desquamation, being of a similar nature, may also occur; and these two processes, going on at about the same time, or, as is more generally the case, the renal a short time after the cutaneous, may both proceed to a considerable extent in consequence of the patient having imbibed a large dose of the poison. But it is easy to conceive that by far the greater quantity of the poison may have fallen on the skin, or on the kidneys respectively, and, consequently, that in the former case the renal, in the latter the cutaneous, affection may be almost wholly absent, or, at all events, but very slight. Although altogether an exceptional case, it is quite possible, and, indeed, I know it for a fact, that dropsy may follow an attack of scarlet fever, in which the cutaneous desquamation has been very copious.

But to proceed with the case of Scales.—When admitted on November 4th, he had some effusion into the peritoneal cavity, but very little into the cellular tissue generally; he was passing about six ounces only of urine in the twenty-four hours, and this was highly albuminous. A warm bath was prescribed for him every night, mustard poultices were directed to be placed over the loins, a scruple of compound jalap powder was given every morning

as a purgative, to carry off water by the mucous membrane of the bowels, and three drachm doses of the liquor ammoniæ acetatis were given every fourth hour, with a view to determine more decidedly to the skin. On the 7th, three days after the commencement of the treatment, twenty-eight ounces of urine were passed in the twenty-four hours; on the 8th, the quantity fell to twelve ounces in the same period; on the 9th, also, twelve ounces; on the 14th, only eight ounces; on the 15th, ten; and on the 16th, only eight. There now came on a very important symptom — viz., vomiting without any distinct cause, and, as the quantity of the urine continued to diminish, it seems highly probable that the vomiting was due to defective action of the kidneys, with the consequent accumulation in the blood of certain of those constituents, which ought to be eliminated in the urine;—due, in fact, to what is now termed *uræmic poisoning*, or, as I would prefer it, *poisoning by some of the constituents of the urine*—as, in the present state of knowledge, it cannot be decided with certainty which of the elements of the urine constitutes the poisonous matter.

On the 19th, only six ounces of urine were passed in the twenty-four hours, the dropsy had considerably increased, great dyspnœa and cough had come on, and the lungs were rapidly becoming highly œdematous, as proved by the existence of

moist crepitation, heard generally over the chest; and on the 21st the patient died, in consequence of extreme difficulty of breathing.

A *post-mortem* examination of the body revealed a large amount of fluid in the pericardial sac, with several patches of recently effused lymph on the surface of the heart. The lungs were so œdematous that they almost sunk in water; and the kidneys presented a very characteristic appearance, and one with which, if you watch many cases in which death occurs in dropsy after scarlet fever, you will almost always meet. The condition of kidney to which I allude, consists in a remarkable whiteness of the cortical substance, with a highly red and congested state of the medullary cones. The Malpighian bodies under these circumstances are pretty large, and the minute vascular system of the kidney is gorged with blood; while the uriniferous tubes, on the other hand, are crammed with epithelium, which thus gives the cortical portion of the organ its white character.

The peculiar whiteness of the cortical substance of the kidney is due to the great quantity of epithelium which is accumulated in the convoluted portions of the tubes which chiefly compose it, and which, by compressing to a certain extent the intertubular vessels, keep up the congested and gorged state of the Malpighian bodies. The great augmentation of the intra-vascular pressure in these

vessels, allows not simply water to transude through them, as happens under ordinary circumstances, but water *plus* albumen, *i. e.* serum, and even fibrin; and, therefore, the amount of albumen in the urine is always proportionate to the quantity of serum transuding through the walls of the Malpighian capillaries, and proportionate, also, in great measure at least, to the degree of pressure exerted by the blood within these vessels. There is a kind of vague notion with some, that there is a sort of *secretion* of albumen, and that it is by some modification of secretion that this substance finds its way into the urine; but I can scarcely think this a correct view, for the process is, in truth, of the simplest possible nature, being merely one of *transudation* or *filtration;* the force which, under ordinary circumstances, sends the watery part of the blood out of the Malpighian vessels, being so increased as to expel more or less of albumen along with the water.

The state of the lungs, in this and other similar cases, is very remarkable. These organs are found in a highly œdematous condition, and so charged with blood and serum as nearly to sink in water. How are we to explain this? An analogous condition occurs in other diseases which arise from the influence of an animal poison, as in typhus, in measles, in hooping-cough. It is found also in certain states of heart-disease, when the returning pulmonary blood is much impeded;

and we find it likewise in animals in whom the vagi nerves have been divided in the neck.

In the class of cases now before us, there is probably more than one cause which contributes to the production of this state of lungs. First, no doubt the impeded circulation through the kidneys increases the backward pressure on the left ventricle and on the left auricle, and thus a certain degree of impediment is offered to the return of venous blood from the lungs; secondly, the impure state of the blood impairs the forces of the capillary circulation in the lungs, as elsewhere—and thus we find an impeded flow and a retarded flow. Finally, the watery state of blood favours transudation, and consequent œdema of the lungs, which, in its turn, interferes with the perfect aeration of the blood, and increases the general dropsy, or at least opposes its diminution. No wonder, then, that the supervention of œdema of the lungs in dropsy after scarlet fever should always prove a formidable, and often a fatal symptom.

In the next lecture I shall call your attention to some additional cases in illustration of this form of dropsy, and make some further remarks on its clinical history and treatment.

LECTURE VII.

On Dropsy after Scarlet Fever.

In the last lecture, gentlemen, I gave you a sketch of the clinical history and pathology of that form of dropsy which often follows scarlet fever, and detailed to you an average case proceeding to a favourable termination.

I also pointed out to you some of the serious complications of the disease which tend to bring about a fatal result, and related the case of a boy (Scales—Case XIX.), whose death seemed mainly due to pulmonary œdema, complicated with pericardial inflammation and effusion.

The first case to which I shall call your attention in to-day's lecture is of much the same kind, and terminated fatally with similar symptoms.

Case XX.—The subject of this case is a child named Samuel Andrews (vol. xlii. p. 157), lately under my care in Sutherland ward. It is of the greater interest, from the struggle which the poor boy made for life. At one time, indeed, great hopes were entertained that we might have carried this patient through, but the dropsy ultimately baffled all our efforts. We have the

following history of this lad:—"He is six years of age, and was always very healthy until about three weeks before his admission into the hospital, when he became dull and did not play as usual, and had frequent shivering fits, with occasional sweating and heats." This was probably the time when he imbibed the scarlet-fever poison; and if he had then been examined by a medical man, some symptoms of his being under its influence would most probably have been detected. "Soon after this, his mother noticed that his legs were swollen, that he had a sore throat, and that his body was very red and hot, and she took him to a 'doctor,' who said he had 'erysipelas,' and treated him for that complaint."

He was brought to the hospital on December 6th, 1853, and the following description of him was entered in the Case Book:—"He is a very pale child, his face is highly œdematous, and he has much dropsy of the legs; his throat is much inflamed, and externally the glands of the neck are considerably enlarged; his pulse is 120, and his respirations are 28 in a minute; his urine is perfectly free from albumen."

It should be here stated that the urine of this child, though it did not contain any albumen, deposited on standing a slight, cloudy sediment, which, on being subjected to microscopical examination, displayed renal epithelium and epithelial

casts in considerable quantity. It was quite clear, therefore, that there existed, at this time, an irritated state of the kidneys, which, when considered in conjunction with the other facts of the case, sufficiently explained the general dropsy. Up to the 15th, the urine continued free from albumen; but on the 19th, the report is, "the urine is highly albuminous;" and from this time, this excretion contained all those materials which are usually met with in it, in the dropsy that follows scarlet fever.

This patient very soon began to suffer from congestion of the lungs, and the glands of the neck became much irritated; both very unfavourable signs in this disease. The report of the 19th runs thus:—"Much worse; the glands of the neck are greatly swollen; there is much difficulty in swallowing; breathing greatly oppressed; pulse 122; respirations 44; the urine is highly albuminous, and contains a large quantity of lithates, with *epithelial* and *small waxy casts,* and scattered renal epithelial cells in great numbers; also a few blood-corpuscles."

An interesting point in this case was the constant existence of much more œdema of the left lung than of the right. This was explained by the fact that the boy lay almost always on the left side, and that gravitation favoured the accumulation of blood and the filtration of serum in that lung. All dropsies, as you doubtless know,

are much influenced by position: for example, if a person have dropsical swelling of the ankles simply, it is always worse in the evening than in the morning, and usually disappears after lying down a short time; and again, if there be general dropsy, and one upper extremity be allowed to hang more than the other, that limb will become the more swollen of the two.

There was a great sameness of symptoms in this patient for some days, but all through the case it was apparent, from physical signs, that the left lung was far more œdematous than the right. From the 21st, the child gradually got worse; the chest symptoms increased; and on the 23rd the pulse was 120, and the breathing 60 in a minute. On the 26th, the pulse was 170, and the respirations were 70; but on the 27th, a very remarkable change took place with respect to the frequency of the pulse and breathing. This I am inclined to attribute to an alteration in the treatment made the previous day, when an eighth of a grain of tartar emetic was ordered to be given every four hours. On this day the pulse had fallen to 84, and the respirations to 40. This change, however, for the better was but of short duration; on the 28th all the symptoms had returned in their former severity, the pulse was 140, and the respirations were 52. On the 29th the numbers were 132 and 64 respectively; and from this time they steadily increased, until at length

the poor child died in a state of extreme exhaustion, worn out by the rapid breathing. During all this time the quantity of the urine kept at a very low point, frequently not more than five ounces being passed in the twenty-four hours; and, during the last two or three days of his life, the little patient suffered greatly from vomiting. Unfortunately, we were unable to obtain permission to examine the body in this case; but there can be very little doubt that there was a condition of kidney and lungs identical with that of the boy Scales, the cause of death in both these patients being, as we have seen, intimately connected with an œdematous state of the latter organs.

It would seem, indeed, that, in this form of disease of the kidney with acute dropsy, as well as in that which appears to proceed from cold independently of the scarlet-fever poison, the most common cause of death is the dropsical state of the lungs and the impeded state of the circulation through these organs, with the consequent imperfect respiration.

Other causes of death, however, you will find in coma, with or without impaired pulmonary circulation, and in convulsions. Both these conditions, indeed, will occur soon after the scarlet-fever poison has entered the system, before any rash has appeared, or while it is appearing. When convulsions occur, they produce great exhaustion,

and with the more certainty if the convulsive paroxysms follow each other in rapid succession; the exhaustion being, without doubt, the immediate cause of death.

Although in some degree foreign to the subject of dropsy, let me here introduce to you a remarkable case to show how rapidly the scarlatinal poison may take hold of the whole frame, producing the peculiar state of kidney and causing death by coma in a very few hours. The particulars of the case were collected by my clinical clerk, Mr. E. Liveing, whose words I shall quote.

Case XXI.—George Dollin, æt. 11, admitted November 4, 1854 (vol. xxxviii. p. 81). This boy had never anything wrong with him until the illness for which he was brought to the hospital, which began yesterday morning (Nov. 3) at seven o'clock, when he was taken suddenly ill, and called out to his mother, "Mother, I am so sick, I think I am dying."

She found that the boy had vomited at least a pint and a half of yellow frothy fluid with red spots in it like blood. She gave him a dose of tincture of jalap about eight o'clock, which operated about an hour and a half afterwards, and brought away a quantity of slimy fluid with a greenish-yellow sediment.

At seven o'clock in the evening he began to be feverish, hot, and thirsty, and drank a pint and a

half of slops, and his feet and hands became extremely cold and purple. His mother then put him into a warm bath, and afterwards wrapt him up in a blanket; but he did not perspire at all. She sat up with him all night, and he was delirious the whole time, talking, dreaming, and singing. At seven o'clock this morning (Nov. 4) he had another attack of vomiting, but did not vomit as much as yesterday; he was also purged, a greenish-yellow biliary-looking fluid coming away, but no blood.

When he was brought in on the morning of Nov. 4, he appeared quite comatose, and could not be roused; he vomited a small quantity of biliary-looking fluid. The pulse at the wrist is so weak that it can scarcely be felt; the heart beats about 184 in a minute; he breathes with difficulty, and with irregularity, if you disturb him; hands and feet purple and very cold; face dusky, and lips purple; the tonsils are large, and fauces red; there is some rhoncus at every part of the chest; he has a red blush over him. Dr. Todd thinks it will turn out a case of scarlet fever, if he survives the collapse in which he is at present. The pupils are contracted. Notwithstanding the free application of stimulants, external and internal, he died in the afternoon.

On inspection of the body, the following points were noted:—

Brain—congested, grey matter very dark, looking like the brain of a person poisoned with opium.

Kidneys—had all the appearance of the scarlet-fever kidney, the peculiar whiteness of the cortical substance, and the red congested state of the medullary portion being well marked.

Spleen—large.

Peyer's patches in the intestine were very large and distinct.

Urine contained much bile.

It was ascertained that there had been no particular illness in the house or neighbourhood from which this lad came, with the exception of a case of scarlet fever three months previously.

This lad's brother, æt. 27, was in the hospital at the time of his admission, convalescent from rheumatic fever. After the boy's death, he was allowed to go out to attend his brother's funeral. A month afterwards he was re-admitted with acute renal dropsy.

It seems to me that no doubt can be entertained that this lad died under the overwhelming influence of a large dose of the scarlet-fever poison, and one is forcibly reminded by this case of the prostration so often caused by the choleraic poison.

Death is often caused in scarlatinal dropsy by extensive serous inflammations.

In the following case a rapid pleurisy appears to have been the cause of death.

Case XXII.—A girl, eleven years of age, had an attack of scarlet fever a month before her ad-

mission into the hospital. The symptoms of the fever were ill defined, and the eruption was imperfectly developed. The attack appeared to be a mild one. She was treated as an out-patient, and seemed to get well. Just before she was brought to the hospital, having been exposed to cold and wet while still suffering from sore-throat and a harsh dry skin, a new set of symptoms came on. The urine became scanty, smoky in colour, and highly albuminous; it contained numerous epithelial cells, and grains of uric acid. Anasarca supervened, affecting all the parts of the body. The child complained much of headache, and was deaf. She was bled and purged, had diuretics, and was blistered on the back of the neck for the head affection.

The symptoms underwent no material alteration up to the 26th of November, when she was seized with diarrhœa, which was followed by an epileptic fit, and this was repeated twice. From that time she remained in a semi-comatose state for some days, when she was seized with dyspnœa, accompanied with delirium, both of which continued till her death. During this time her urine was very scanty, and was passed almost entirely with the motions. A day or two before her death a small quantity was obtained, and this was found to be highly albuminous, and to contain epithelial particles in great abundance.

At the post-mortem examination, the brain was found to be healthy, but hyperæmic; there was no

sub-arachnoid effusion; the liver was enlarged, and there was a copious effusion of serous fluid into both pleuræ, and recent lymph was poured out upon the surface of the pleural membrane. The kidneys afforded excellent examples of the scarlet-fever kidney; the cortical substance was white, and the pyramidal portion red; the tubes were filled with epithelium.

From these fatal cases let me turn to one or two of a more agreeable kind, the favourable termination of which, we may hope, has been in some degree aided by the care and treatment afforded here.

Case XXIII.—The general course of scarlet fever, and the visceral irritations which the poison is apt to produce, and in which are laid the foundations of dropsy, are well illustrated by the case of a little girl in Lonsdale ward, named Alice Lyons, æt. 10 years (vol. xliii. p. 165), who was brought to the hospital on December 19th with the scarlet fever upon her. At the time of her admission, sore-throat was the only symptom of the disease present, and on the 20th the rash made its appearance. The only peculiarity in the case at this time was, that she had almost constant vomiting, as if the fever-poison had extended its influence, as that of small-pox often does, to the mucous membrane of the stomach. The rash soon began to go off, though

it did not thoroughly disappear till the 27th, but still the red colour of the fauces and tongue remained for some time afterwards, and the lingual papillæ, also, continued very red and prominent. On the 28th a slight rhoncus was audible throughout both lungs, and the urine, although it remained perfectly free from albumen, exhibited under the microscope a few *epithelial and small waxy casts.* The chest symptoms increased, and she became oppressed in her breathing, and suffered from cough. On January 5th the urine was still slightly albuminous, and it also contained those further indications of renal irritation, namely, scattered renal epithelium, with *epithelial* and *small waxy casts* as before, and a few blood corpuscles. Since these symptoms showed themselves, the daily quantity of urine varied from fourteen to sixteen ounces.

Up to the time when her chest began to suffer she was treated by diffusible and alcoholic stimulants, and nitrate of silver was applied to the throat; and, although she was extremely prostrate on admission, and the fever ran high, all the primary symptoms yielded in the most satisfactory manner. For the oppressed breathing and the pulmonary symptoms, it was determined to exhibit tartar emetic in doses of one-sixteenth of a grain thrice a day. Vomiting was at first excited by this remedy, but she soon became tolerant of it, the breathing and cough im-

proved very much, and she continued to take it till the 18th. Although the quantity of urine showed no tendency to diminish, the albumen increased, and the casts and epithelium and blood-corpuscles were still found in it, and she complained much of pain in the back. Two leeches were now applied to the loins, and bitartrate of potass was given in scruple doses every sixth hour, the antimony being omitted. A threatening of dropsy showed itself just at this time, in an increased pallor of the face, a peculiar waxy appearance of the skin, and a slightly œdematous state; but this quickly gave way, and a very free desquamation of the cuticle took place for some days, giving countenance to the view which I have expressed to you at a former part of this lecture, as to a certain degree of antagonism between free desquamation of the skin and the dropsical state. The quantity of urine now began to increase in a very decided way, but the irritated state of kidney persisted, being indicated by the continued appearance of epithelium and casts in the urine, and the addition of pus-cells and pus-casts. All fever having subsided, and the pulse having fallen to 78, she was now ordered the tincture of the sesquichloride of iron, in doses of eight minims three times daily. Under this treatment she made rapid progress, and recovered strength and colour, but was thrown back for some days by an

attack of hæmorrhage from the kidney, brought on probably by some indiscretion of diet; this yielded to the use of gallic acid in a week, and she then resumed the steel, under which she improved greatly and grew fat. On the 15th of March all traces of albumen had disappeared from the urine, and on the 25th she was reported to be quite well.

The chief interest in this case consisted in the long continuance of some of the conditions which usually produce dropsy. Despite, however, of the persistence of the irritated kidney, the dropsy made no progress, although there was a decided threatening of it about the fourth week. I cannot doubt that if this child had not been most carefully protected from cold, if the action of the skin had not been promoted and soothed by the frequent use of warm baths, and if, in fine, there had not been a pretty free desquamation of the cuticle, and also, if the child had not been well and carefully fed, dropsy would have developed itself fully in this case. Of the conditions for the production of the dropsical state we had quite sufficiently developed the irritated kidney, less perfectly the state of blood, which doubtless would have become poorer had the child been poorly fed, and still less perfectly the state of the skin.

Case XXIV.—The case of a little boy named Alfred Austen, æt. 8 (vol. xl. p. 203), to which

I referred briefly in the last lecture, will serve to compare with that just detailed, it having terminated favourably.

This child was brought into the hospital in a highly dropsical condition on December 28th. His mother could give no satisfactory account of the primary symptoms of scarlet fever. She stated that the child had been healthy until she changed her residence into a court which proved to be very damp. The first signs of illness were soreness of the eyes and drowsiness; and these were very speedily followed by swelling of the belly, face, eyelids, and legs. A brother and sister were similarly affected, and this circumstance rendered it in the highest degree probable that all three must have been exposed to the same contagion.

The child exhibited, on admission, the peculiar pallor of skin, with universal dropsy. The urinary secretion was below the normal amount—about sixteen ounces in twenty-four hours—it was loaded with albumen, and contained granular and waxy casts, and some pus-cells. The sounds of the heart and lungs were natural. The pulse was 120, and the respirations were 36. He was ordered an occasional warm-bath, and one-sixteenth of a grain of tartar emetic every fourth hour, with beef-tea and milk diet.

The tartar emetic at first sickened him very much, but he soon became tolerant of it, and he

continued its use till the 7th of January, the dropsy diminishing, the skin acting slightly, and the urine having increased in quantity up to twenty-eight ounces.

On the 7th the tincture of the sesquichloride of iron was given. On the 13th the urine had increased to fifty-four ounces, some blood-discs and casts were found in it, but there were no pus-cells. On the 16th the urine was two pints in quantity. A marked diminution had taken place in the dropsy, especially of the abdomen and limbs. The quantity of albumen in the urine was much lessened. On the 19th the albumen was very small in amount. On the 26th the albumen was again increased, there were no blood-corpuscles nor casts, but very numerous crystals of lithic acid. On the 7th of February sixty ounces of urine were passed, and no trace of albumen could be discovered. On the 14th, however, a small quantity was again found, with crystals of lithic acid and casts; this had disappeared on the 18th, and from that time the urine continued free from albumen until the 2nd of March, when he left the hospital apparently quite well.

Crystals of uric acid are of very common occurrence among the sedimentary matters in the urine of children suffering from dropsy after scarlet fever. They often exist in such quantity as to give a dark smoky colour to the sediment, and even to the urine itself, and to excite strong

suspicion as to the presence of blood, in cases in which it will turn out not to be present. They occur chiefly, I think, in the milder cases, and in the severe cases on the decline of the irritation of the kidney. Their presence, therefore, as it appears to me, ought to be rather regarded as of favourable omen.

Let me conclude this lecture with some remarks on the treatment of this form of dropsy.

The practitioner ought chiefly to aim at relieving the irritated state of the kidneys by such means as will not deteriorate the *quality* of the blood. You must look upon the kidneys in these cases as irritated by a poison, and that in consequence of this there is an undue afflux of blood to them, just as there is to the conjunctiva when a particle of dust gets into the eye. It can be of no use to take away blood in such a case as this. You must first get rid of more or less of the poison. In the example to which I have referred, of an irritated conjunctiva, it would be of no use to, at once, apply leeches to the conjunctiva or the neighbouring integument; the rational plan would be to remove the irritating substance by some mechanical means, and then, if the congested state remained, to employ leeches.

So, in this state of kidney, it is not advisable at first to abstract blood, either generally or locally, first, because such a proceeding will not

remove the *cause* of the morbid state of the kidneys; and secondly, because it tends to deteriorate the *quality* of the blood, which has been already, through the influence of the poison, rendered quite poor enough.

You must, in the first instance, endeavour to bring about the elimination of the poison, through some other channel as well as the kidneys, such as through the skin or bowels; and this will relieve the kidneys far more efficiently than any other means to which you can have recourse. For this purpose, in the commencement of the disease, whether dropsy be present or not, the frequent use of the warm bath, or the vapour bath, daily if necessary, is very beneficial, provided the patient be strong enough to bear these measures; but he should never be allowed to remain in the bath sufficiently long to induce weakness, or to diminish his strength. Baths of high temperature should be avoided; a heat of from ninety to ninety-five degrees Fahr. is amply sufficient.

With the view of eliminating the poison by the bowels, such purgatives should be employed as produce watery evacuations. Now and then you may give a dose of calomel, followed by a saline aperient; or you may use, in preference to mercury, the compound jalap powder; but all purgative medicines which cause free watery discharges by the bowels are of decided service in this form of dropsy.

You may also do good by promoting the discharge of water through the kidneys by means which do not tend to increase the irritation already existing in these organs; but, as many of you are no doubt aware, in the whole list of medicines there are none so uncertain in their action, and which, for that reason, we use so tentatively, as those classed as *diuretics*. The diuretics which appear to be most useful under these circumstances, are such as appear to exert a chemical action (whatever be its precise nature)—the bitartrate of potash, for example, and the benzoate of ammonia. The free use of diluents and of the alkaline carbonates or citrates is also to be recommended.

If, after an early treatment of this kind, there still remain evidence of a congested state of the kidneys, you may then have recourse to local bleeding, by leeches or cupping, over the loins. I think it is much better to adopt this measure in these cases *late* than *early*, and I have seen much more benefit result from it when so employed than when it has been resorted to at the commencement of the attack. I explain this on the principle already referred to: the primary congestion of the kidney is due to the direct influence of an existing poison; and notwithstanding the removal, or the diminution or dilution of this, a residual congestion is apt still to be present. This may be considerably relieved by the local abstraction of a small quantity of blood, just

as (to have recourse to my former simile), after the removal of a particle of dust from the eye, a state of congestion often remains, which is greatly benefited by the application of cold, or of a leech or two, or it may be, in some cases, by warm fomentations. Observe, all that I ask you to do is, if you practise blood-letting at all, do it from some well-founded principle, and not in an empirical or routine way; and always bear in mind that it is a remedy of great potency, frequently for evil, sometimes for good.

There is no special remedy, that I know of, for the peculiar state of lung that so often manifests itself in these cases, and all that you can trust to is the gradual restoration of the blood to its normal condition, and the recovery of the general powers of the patient. The way to promote this is by endeavouring to keep up the heart's action, and by upholding the general strength; so that, while, on the one hand, you are endeavouring to eliminate morbid matters from the system, you must, on the other, carefully feed the patient, particularly by the well-regulated exhibition of stimulants, which, properly speaking, are nothing more than a peculiar kind of food. If wine and brandy be digested badly or not at all, they should not be given; and what I would have you bear in mind is, that alcoholic stimulants should be dealt with just as beef and mutton, and that they should be regarded as merely hydrocar-

bonous matter in a subtle form, to be administered carefully and by system, as you would give other aliments, not in a slovenly, irregular manner, or according to the mere whim of the patient or his nurse. Try to form a fair estimate of his power of digesting these substances, and give them accordingly.

In several cases of this dropsy I have used tartar emetic with benefit, as a medicine which determines to the skin, and which exercises a certain sedative influence upon the pulmonary circulation. It is one of the best medicines for this purpose that we possess; but if I do not have recourse to it often, it is because it is so very uncertain in its effects on different individuals. As a general rule, I think it may be laid down, that when patients quickly tolerate it, it is an excellent remedy; but when, on the other hand, it nauseates and sickens, its action is rapidly exhausting. It is for this last reason that tartar emetic has been so vaunted by the ultra-antiphlogistic practitioners, because it frequently completely knocks down the patient, and, they suppose, the disease also; but be assured that you cannot be too circumspect in the employment of this drug, for very many patients have been so prostrated by it that they have never got up again. The medicine which I most prefer for acting on the skin, in these and other cases, is the *liquor ammoniæ acetatis,* in doses of from two or three to six drachms;

and it likewise acts most favourably as a sedative to the circulation. Digitalis may also be used, but only under close watching; but, generally speaking, when the lungs are involved in the manner we have witnessed in the cases referred to, more good is obtained by frequent counter-irritation of the chest at different points, and by the use of diffusible stimulants, such as ammonia, chloric ether, and alcoholic fluids, than by any other means.

LECTURE VIII.

On Acute Renal Dropsy.

GENTLEMEN,—The consideration of that form of dropsy which is especially distinguished by the name of *Acute Renal Dropsy*, follows naturally upon that of dropsy after scarlet fever. Both are examples of dropsy in its most acute form. In the latter we can trace the direct influence of an animal poison, which produces well-defined phenomena, as constant and specific as those which would arise from the ingestion of arsenic, prussic acid, or strychnine. In the former we have a dropsy of a precisely similar kind, and a state of kidney also the same; but we are unable to trace up these pathological conditions to the influence of any agent introduced from without.

Let me illustrate the clinical history of an ordinary case of this form of dropsy, ending favourably, by the following examples.

CASE XXV.—James Owen, æt. 40, in the Sutherland ward, has been in the hospital some time. He is by profession a chimney-sweep—a trade much exposed to privations and hardships. For the last three years he has had winter cough, with

attacks of an asthmatic character, accompanied with all the symptoms of chronic bronchitis. The existence of this congestive tendency in the lungs is a powerful predisposing cause to dropsy; and this we can readily understand, from the relation of the pulmonary to the general circulation; for any obstacle in the lungs is immediately thrown back on the right ventricle, and thence through the right auricle is communicated to the whole venous system. And, when we consider with what little force the venous circulation is carried on, it is not difficult to conceive that a slight impediment can readily cause retardation of it, and consequent dropsy.

We see, then, that the previous condition of our patient was such as to predispose to dropsy. This winter he has had one or two of his old attacks of cough, and a few days before entering the hospital he was more than usually exposed to cold. This exposure to cold, I would observe, is a very common feature in the history of these cases. Its effect was first felt on the lungs, but no doubt it had also a less perceptible influence on the skin, checking the cutaneous excretion, throwing more work on the kidneys, and thus producing renal irritation. Three or four days after the exposure, the scrotum began to swell, shortly after this the legs, and finally the effusion spread to the upper extremities and face, and was accompanied with considerable dyspnœa.

On examining him, I found his chest generally resonant on percussion; the breathing was vesicular everywhere, accompanied with more or less of sibilus, which was greatest at the posterior portion of the lungs, the congestion of which was favoured by gravitation; there was universal anasarca; the urine was highly smoky, in diminished quantity, of specific gravity 1018, and on the application of heat and nitric acid it became almost solid, coagulating much in the same way as the pure serum of blood would do, and thereby showing that this fluid constituted a large portion of what he passed from his bladder.

On his first entry into the hospital, our patient was so much depressed that there was no choice of treatment, and I was obliged to prescribe the administration of ammonia and other stimulants; under the action of which he recovered himself in a great degree, and was then able to bear the ordinary plan of treatment.

I must beg your particular attention to the order in which the phenomena showed themselves in this case:—1st, there were the previous condition of chronic dyspnœa, pulmonary congestion, and the consequent tardy venous circulation (predisposing symptoms); 2nd, exposure to cold; 3rd, the check to the action of the skin, consequent irritation of the kidneys, and the suppression of their secretion; 4thly, the development of anasarca, which appeared not in the most dependent parts, but in those

parts which afford least resistance to the effusion: frequently, instead of the effusion seeking the most dependent part, the face is first affected, but very commonly the scrotum is its first seat: a common order is, the scrotum, eyelids, face, then the lower extremities, and, finally, the upper extremities. But whether this order be followed exactly or not, the fact most worthy of your attention is, that the development of the dropsy in these cases is in a great measure independent of position; and this circumstance alone ought to lead you to the suspicion that the dropsy is of an acute character. 5thly and lastly, we have to observe the condition of the urine,—its small quantity, smoky colour, and the abundance of albumen in it, showing the escape of the serum of the blood, and of its red particles.

Now, the train of phenomena afforded by this case very closely represents that which is ordinary in the generality of cases of *inflammatory* or *acute renal* dropsy, so that I may say, *ex uno disce omnes;* one case of this kind carefully studied gives you a considerable insight into the clinical history of the disease. And as the history of this patient up to this point affords a fair representation of the average cases, so will its further progress illustrate the course which this malady generally takes in its milder forms.

Its principal difference from the ordinary class of cases consists in the existence of an antecedent pulmonary irritation, which proved the more favourable

to the development of dropsy. Irritation and congestion of the lungs, indicated by more or less rhoncus and sibilus, are, however, frequently present in cases of acute dropsy, being set up at the same time as the cutaneous irritation, and doubtless originating in the same cause.

On my first visit to our patient (on the 10th) I ordered him a hot-air bath: this was attended with almost immediate benefit. The next day (11th) the dropsy was much diminished, but it was still abundant, and I prescribed a purgative, choosing the compound powder of jalap, on account of its hydragogue properties, and because the bitartrate of potash which enters into its constitution favours diuresis. We found, after the frequent use of the hot-air bath, sudorifics, and the application of free counter-irritation to the chest, that in nine or ten days the dropsy had disappeared, finally leaving him on the 21st: his urine, however, continued smoky, but was much increased in quantity. Examined by the microscope, it was found to contain blood corpuscles, fibrinous casts of tubes, epithelial cells, and crystals of uric acid; so that in this case the smokiness was kept up by the same two causes which originally produced it—namely, congestion and irritation of the kidneys; the specific gravity of the urine was 1015, and the albumen was much diminished.

I shall add, for the sake of further illustration, another example of this disease, not preceded by any chronic bronchial affection.

Case XXVI.—A woman, æt. 25, in the sixth month of her pregnancy, had always enjoyed good health until a month before her admission into the hospital, when, from exposure to cold, she became troubled with cough and hoarseness. A fortnight after this she observed a swelling of the labia pudendi and of the legs; her urine became scanty, and she noticed a red sediment in it. On her admission there was considerable œdema of the labia and of the lower extremities, accompanied with distinct signs of fluid in the abdomen. The urine was scanty, smoky, and highly acid; it was turbid and abundantly albuminous; on standing it deposited a sediment of lithate of soda, and it had a specific gravity of 1027. It was not examined miscroscopically. The skin was dry. In this case I endeavoured to promote the healthy action of the skin by the use of warm baths and by the administration of tartar emetic and Dover's powder. Under this treatment the urine soon became free from albumen, the dropsy entirely disappeared, and in twelve days the patient was well.

It is likely that the weight and pressure of the gravid uterus in this case determined the dropsy to the lower parts of the body.

Such, then, is the ordinary course of events in mild cases of acute renal dropsy. I shall now proceed to review, in detail, the various organic derangements which accompany and complicate this form of dropsy.

These may be arranged in two classes:—first, the *intrinsic*, and, secondly, the *extrinsic*.

The first or intrinsic derangements stand to the dropsy in the relation of cause to effect. They are those which belong specially to the peculiar anatomical condition of the kidney, which is the same as that which occurs in dropsy after scarlet fever. A large accumulation of epithelium takes place in the renal tubes, owing, probably, to its being formed more quickly than it can be expelled. In short, we find that there goes on during life, in this disease, a desquamative process, affecting the kidney, just like that of which the skin is the seat in scarlet fever. The simultaneous, or nearly simultaneous, occurrence of the analogous conditions of the skin and kidney is the ordinary course of events in the scarlatinal dropsy; but in the form now under consideration we do not find the state of desquamation affecting the skin, although great dryness and harshness of it frequently occur, showing a state of irritation of that integument.

A greater or less degree of congestion of the kidneys accompanies this accumulation of the epithelium. The Malpighian bodies are more or less enlarged, and all the small vessels dilated. The greatest accumulation of blood takes place in the Malpighian tufts, and in the minute vessels of the pyramids; and for this reason it is, that these latter parts of the organ are very red, while, owing to the accumulated epithelium in the tubes, the cortical portion is white.

This state of distension of the blood-vessels

favours the occurrence of a phenomenon which often forms a very serious complication of this form of dropsy. If the primary condition of irritation or inflammation does not terminate by an early resolution, hæmorrhage is very apt to supervene. The vessels, long dilated by the pressure of an undue efflux of blood, suffer in their contractile power, and, becoming weakened, give way at various points: nor do they recover until the general nutrition of the kidney is restored by the discharge of a large quantity of the epithelial particles which surcharged its tubes, and contributed, with the increased flow of blood, to create the enlargement of the organ.*

In some cases pus is found in the tubes, affording evidence of a suppurative process having taken place. We obtain proof of this formation of pus during life by finding the peculiar pus-corpuscles along with other matters in the urine. And when this occurs the lungs are very apt to exhibit signs of an œdematous condition, which interferes greatly with the respiratory process, and, by impeding the heart's action, increases the dropsy and favours a fatal termination.

The second class of complications connected with this form of dropsy are,—

First, inflammations of serous membranes.

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* See the cases in Lectures I. and II. illustrating the connexion of hæmaturia with this form of dropsy.

The pericardium and the pleura are those which are most subject to these inflammations; but sometimes the peritoneum is affected. Pericarditis, indeed, is a frequent concomitant of albuminous urine in all forms of diseased kidney, as was some years ago well proved by the late Dr. Taylor from a large induction of cases. These acute inflammations are, however, more common in the acute dropsies than in those which are associated with the various states of chronic disease of the kidneys.

Effusions are also apt to take place into the serous cavities with or without previous inflammation. The peritoneum, although the least liable to inflammation, is the most subject to these effusions.

The following is an interesting example of the simultaneous supervention of pleurisy and peritonitis with slight pericarditis.

Case XXVII.—The patient was a fine-looking young man, æt. 23, of regular habits, and who had never suffered from privations. He was admitted into King's College Hospital, October 12th, 1840 (vol. i. p. 262).

After exposure to cold three weeks before his admission, universal anasarca came on, beginning at the face and eyelids, and spreading quickly to the scrotum, limbs, and trunk, accompanied with much pain in the back, and a marked diminution

in the quantity of the urine, which never exceeded a pint and a half in twenty-four hours, and often fell much below that amount. The urine became nearly solid under heat and nitric acid; it had a smoky hue, and its specific gravity ranged between 1015 and 1020. In addition to the external dropsy, there was a small quantity of fluid in the peritoneal cavity.

Blood was taken freely from the loins by cupping, and small doses (one-eighth of a grain) of tartar emetic were given three or four times a day. Half a grain of the extract of elaterium was administered once daily. Although he was freely purged, no material improvement followed this treatment, excepting that the kidneys began to act more freely, and as much as four and five pints of urine were passed in the day.

On the 22nd he was bled from the arm to ten ounces, and on the 27th he was bled again to six ounces. On the 12th of November the dropsy remained much the same; there was extended dulness over the region of the heart, giving rise to the fear that some pericardial effusion had taken place. The bitartrate of potass was now exhibited, and he continued to pass four pints of urine per diem.

At midnight on the 16th our poor patient (who was a fine, able-bodied young man, and bore his illness with great calmness, and greatly interested us all) was seized with severe rigors and vomiting of

bilious matter, accompanied with severe pain in the left side, opposite the seventh and eighth ribs. Between eight and nine o'clock on the following morning (the 17th) the shivering recurred, and lasted half an hour. He was now much troubled with diarrhœa. The breathing also became quick and difficult; a very tympanitic condition of the abdomen came on, but there was no pain on pressure of that region; pulse 130. Leeches were applied to the abdomen, and opiate enemata were given.

On the 18th the abdomen was swollen and tender all over; the breathing was hurried; the abdominal pain was much increased by deep inspiration. The quantity of urine decreased considerably. On the 19th the diarrhœa was much less, but the abdomen had become much more painful; urine very scanty; much thirst. Twenty-two leeches were again applied to the abdomen, and opium was given freely. Hiccup came on, and caused much distress. On the 22nd the patient sank rapidly, but retained his consciousness to the last.

On opening the body the peritoneum was found everywhere covered with flakes of recent lymph: it was very abundant on the peritoneal surface of the bowels, and on the concave surface of the diaphragm. Recent lymph was also effused upon the pleura, but in less quantity than on the peritoneum, and serum was found in considerable

quantity in both pleural sacs. There were some patches of recent lymph on the cardiac layer of the pericardium. The brain and its membranes were healthy. The kidneys were about one-fourth larger than natural, and on section presented the white cortical and red tubular portions of the scarlet-fever kidney. Urea was found in the blood taken from the heart, and in the serum effused into the pleuræ.

It is worthy of note, with reference to this case, that all this acute inflammation came on notwithstanding free local and general bleeding practised before the symptoms were developed.

I made a very careful examination of the kidneys; and, so far as I know, this examination led to the first recognition of the structural difference of the diseased kidney in acute dropsy from that of the large mottled kidney (now called fatty) first described by Dr. Bright. This examination was made in October, 1840; and an extract from the notes then made was published in a clinical lecture in the *London Medical Gazette*, in December, 1845. I quote the extract:—"On referring to my notes of the microscopic examination, I find it stated that the tubes were enlarged, and filled by an abundant epithelial formation, which seemed to distend them. On making a transverse section, the dilated state of the tubes was very conspicuous, and the epithelium could be pressed out of them, leaving only their dilated

walls. Several Malpighian bodies were enlarged."

Although the functions of the brain are often disturbed, it is very rare to meet with arachnitis in acute renal dropsy. States of delirium, and even mania, often supervene, but these are due to a disturbed nutrition of the brain itself; dependent either on the watery and pale state of the blood, or on the irritation of the brain by retained urinary elements. When you examine cases of this description after death, you find no evidence of recent serous inflammation, but only a pale condition of the brain, which is of less than its normal bulk, and is surrounded with more subarachnoid fluid than is usual in the state of health. The delirium in these cases is very analogous to that which occurs in rheumatism and gout.

You may have, as a complication of this form of dropsy, an irritated state of liver, coexistent with the analogous state of kidney; and it is not improbable that this may be the reason of the greater frequency of serous effusion into, or of dropsy of the peritoneum, than of the other serous sacs. In all instances in which the liver is irritated, you may expect to find some degree of yellow discoloration of the skin, and the dropsy not confined to the areolar tissue, but also affecting the peritoneum.

Sickness and vomiting are often present in these cases, and also in the more chronic states of renal disease, and they generally indicate an irritated

condition of the gastric mucous membrane due to retained urinary elements.

What conclusion may we come to as to the *pathology* of acute dropsy? We know that the kidneys are in a state of congestion, which is obviously denoted by their appearance; the cortical substance is red and congested, the Malpighian bodies being large and full. The redness of the cortical substance is in strong contrast with the whiteness of the tubular portion, which is caused by the abundance of epithelium with which the tubes are filled. If examined with a microscope in an early stage, we can see the epithelium quite filling the tubes. We thus obtain clear evidence of an irritated state of kidney, and we also know from the previous history of the case that there has generally been such exposure to wet or cold as would be likely to arrest the excretion by the skin. Thus we have very much the same conditions induced as in dropsy after scarlet fever—namely, an irritated state of kidney, and an abnormal state of skin.

The secretion of the skin being, no doubt, checked, the organic products, which should have passed off in it, make their way out through the kidneys, there acting as a source of irritation: they produce congestion, and this congestion so interferes with the function of the organ that its secretion diminishes: the water that should be eli-

minated does not escape, but accumulates in the blood; and this watery blood transudes the parietes of the capillaries, while the particular portion of the areolar tissue into which it shall be poured—the subcutaneous—is determined by the irritated state of the skin, which attracts blood to it in large quantity. The pathology of this form of dropsy is, then, in nearly all essential points the same as that of dropsy after scarlet fever.

What *prognosis* should we be led to adopt in such cases as these? To this question I answer, that, on the whole, our prognosis may be favourable: death is not common, unless the irritation of the kidney proceeds so far as to produce those extensive disorganizations to which I have referred; but, taking the ordinary class of cases, this kind of dropsy is not to be considered a formidable disease. In forming our prognosis, however, the previous condition of the patient must be taken into account. It often happens that a man has renal disease creeping gradually on without any symptom of its presence, till, on a sudden exposure to cold, active congestion of the kidney is induced, and the secretion of that organ receives thereby a greater or less check: of course in such a case the ultimate danger would be much greater than if the kidneys had previously been in a perfectly healthy state.

In the fatty disease of the kidney, the earlier changes take place slowly and insidiously, and often

without a single symptom to indicate that anything is wrong with the kidney. There are many people at this moment walking about London, who would be very angry at being told that they are otherwise than healthy, yet with whom this disease is creeping on, and whom it will sooner or later kill. The deposit begins to be formed in a few sets of tubes; it gradually extends itself, producing partial congestion of the kidney. At first these congestions are not sufficient to affect the physical condition of the urine, which, if examined at this period, would not afford the slightest indication of disease. By and by, some of the Malpighian bodies become so filled by the retardation of the flow of blood through them, that the serum filters through them, and passing off with the urine, renders this secretion albuminous. This escape of serum offers some relief to the congested parts of the vascular system of the kidney; and if the cutaneous secretion be fairly kept up, and the digestive organs act normally, the patient may go on for a considerable time—sometimes, perhaps, for years—without being aware that there is anything wrong with his kidneys. But let any check to the perspiratory action of the skin take place, as from exposure to cold, and immediately the renal congestion becomes general, and dropsy quickly occurs; and these symptoms show themselves the more rapidly, and the more completely, because of the previous par-

tially congested condition of the kidney, and the more or less impoverished state of the blood.

Cases such as these are of very frequent occurrence in the London hospitals, and many of the instances of cured or relieved Bright's disease are of this description. The patient receiving the care and comforts of an hospital, his skin quickly resumes its normal action, the kidneys cease to be congested, the urine flows freely, and the dropsy disappears.*

Now and then copious hæmorrhage takes place, as I have said. How does this influence the prognosis? Unquestionably it would do so unfavourably. From my own experience I should say that, provided you spare your patient's strength, and do not subject him to too violent antiphlogistic treatment, this copious hæmorrhage is not so much to be dreaded as might be imagined. If pus appears in the urine, I should look upon the case much more seriously. The continuous appearance of pus, derived from the kidney, in notable quantity in the urine, especially when accompanied by an œdematous state of the lungs, is one of the most unfavourable circumstances that can occur in cases of this kind: inasmuch as it indicates a tendency to that kind and degree of disorganization which does not admit of repair. But even the presence of pus need not lead you to take a very

* See Case XIII., Lect. iii. p. 75.

gloomy view of your patient, for many cases recover after the appearance of this product in the urine.

Treatment.—The same principles of treatment apply to the management of these cases as to those of dropsy after scarlet fever.

The first and most important object should be *to promote the action of the skin.* We know that there is that sort of mutual relation between the kidneys and the skin, that embarrassment of the one leads to embarrassment of the other: hence any relief to the irritated state of the one affords great help to the restoration of the other. In the present case, the failure of the cutaneous action has embarrassed the kidneys: hence the great thing is to promote free sweating, and this may be best done by the hot-air bath; or, if you fear its debilitating effects (which are to be taken into account in weakly subjects), you may substitute the warm bath.

You should, next, endeavour to obtain relief to the congestion of the kidneys. This is in part effected by restoring the function of the skin. Local bleeding by leeches and cupping will do much in some cases, but little in others. Now and then, when your patient is plethoric and robust, you may, to save time and trouble, take some blood from the arm, but these, you must remember, are exceptional cases. *As a rule,* general bleeding is better avoided. One of the symptoms which would lead me to have recourse

to general bleeding in a case of this description, is congestion of the lungs; but I would not adopt this practice unless the patient were young, robust, and plethoric, and had been previously in a perfectly healthy state. And even in such cases *large* venesections are much to be deprecated, as tending to debilitate the patient and to weaken those processes of nutrition to which you must look for his restoration to health.

3rd. Purgatives, as indirect means of relieving the congestion of the kidneys, are of great value; they eliminate water and various morbid matters.

4th. Sudorifics may also be employed, and of these the best is the liquor ammoniæ acetatis, in at least half-ounce doses, two or three times a day. This may occasionally be combined with tartar emetic. Dover's powder is generally less suitable, on account of the tendency of the opium which it contains to check the secretion of urine.

5th. Diuretics. When the congestion of the kidney has been relieved, diuretics may be given with advantage. Of all this large class, the best, I think, is the common cream of tartar, in doses of from half a drachm to a drachm frequently during the day. If you give larger doses it acts on the bowels, and being carried off by them, does not prove a diuretic. Benzoate of ammonia is often very efficacious. Digitalis, with due precaution, is also very useful; of digitaline I am unable to speak with any confidence, but I suspect it is a less manageable drug than digitalis.

Irritative diuretics (as cantharides, squills) must be avoided in cases of this kind for obvious reasons, although they are very serviceable in other forms of dropsy. Broom tea, or the compound decoction of broom of the London Pharmacopœia, is also useful; and the latter probably derives some advantages from the taraxacum which it contains. The diuretics first mentioned, however, are unquestionably the most to be relied upon, and the most efficient.

In the treatment of acute dropsy, I must caution you against the use of mercury. This mineral, so valuable in some diseases, is in these cases useless and even mischievous; at any rate, I have failed to observe any benefit from it. For these reasons it is better to abstain from its employment, unless occasionally you may have recourse to it as a purgative. But even for this purpose there is no absolute need for you to use it, as there are many other medicines which answer quite as well, if not much better. Moreover, in all cases of imperfect action of the kidneys, whether acute or chronic, patients become quickly salivated, and the salivation is very apt to prove troublesome and painful; large sloughs often forming in the mouth, and the fœtor of the breath becoming intolerable to both the patient and his attendants.

LECTURE IX.

On Cardiac Dropsy.

GENTLEMEN,—Pursuing the clinical illustration of dropsy, I propose to-day to offer you some observations on *cardiac dropsy,* with special reference to a case of this affection at present under treatment in Fisk ward. The dropsy in this case is mainly dependent on heart-disease, but there are present various other phenomena, which partly tend to complicate, and partly to elucidate the diagnosis, but which are all in a high degree both interesting and instructive. These are pericarditis, renal disease, a congested state of the liver, dependent on the disease of the heart, and other slighter pathological conditions, to which I shall advert as we proceed.

CASE XXVIII.—The patient, Alfred Baylis (vol. xxvi. xxvi. A), is a young man, æt. 30. His occupation has been that most unhealthy one, a house-painter, and he bears, in the blue line round his gums, the badge of his trade. Like many of his occupation, he has been intemperate in his habits; and to this, most probably, his present condition is mainly referable.

He was admitted on the 11th of November, suffering from palpitation, shortness of breath, and emaciation, which quickly supervened upon a profuse attack of hæmoptysis, that occurred two months previously. He had been an out-patient of one of the London hospitals; and five weeks before his admission here dropsy came on in his lower extremities, and has been steadily extending upwards ever since. Under these circumstances he applied for admission. Shortly afterwards he suffered another access of hæmoptysis, and lost a large quantity of blood. These two attacks of hæmoptysis have produced great pallor and anæmia. The patient suffers likewise from distressing dyspnœa, amounting to *orthopnœa*. Upon any attempt to assume the recumbent posture he is at once compelled, by the increased difficulty of breathing, to sit up, and in this position, as you have doubtless remarked, he remains day and night. This orthopnœa has been from the commencement a prominent symptom.

The great loss of blood, of which our patient has been the subject, has mainly promoted another symptom, amaurosis. I say "promoted," because I do not suppose the anæmic state to be the sole cause of the imperfect sensibility of the retina. Our patient has chronic disease of the kidneys, and the impure state of blood consequent on this disease often gives rise to more or less of an amaurotic condition.

This symptom varies with the condition of the heart. When he suffers much from palpitation his sight is worse; when the palpitation is less it is better; showing the dependence of the symptom on the state of the circulation. The fact is, the blood has become poor, and this impairment of quality causes any slight deficiency in the quantity sent to an organ, from inefficient action of the heart, to be felt by it more readily than if the blood were in its normal condition.

Associated with this symptom is another curious one, namely, a remarkable prominence of the eyeballs. This state of the eye-balls seems to have some curious connexion with cardiac disease. It is most frequently seen in women; and in them it is generally met with in connexion with an enlarged thyroid gland. The cause of these associations I do not attempt to explain.*

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* I have seen in so many instances, especially in women, the concurrence of prominent eyeballs, rapid and vehement action of the heart, and enlarged thyroid, that I have long looked upon this aggregate of symptoms as constituting a special disease. It seems to me most probable that the primary evil is the enlarged thyroid; the altered condition of the numerous ramifications of blood-vessels through this gland gives rise to the morbid state of heart; the active nutrition going on in it drawing largely on the blood supply, and accelerating the action of the heart, while the diseased state of the blood-vessels (probably similar to that which Dr. Johnson has described in the small renal arteries, in cases of contracted kidney) creates

In looking into the previous history of our patient, we find that at the age of nineteen he suffered a slight attack of rheumatism. We can get no distinct evidence that the heart was at that time affected: but it is probable that, at the same time with the rheumatic attack, there took place some slight organic affection of the heart, either pericardial or endocardial, which his subsequent unhealthy occupation and intemperance have tended to increase.

His state on admission into the hospital was as follows:—Great exsanguineousness; breathlessness, orthopnœa. Heart's action regular; pulse 84, small. There was an unnatural extent of dulness over the cardiac region, and moreover, the pulsations of the heart were visible in the region of the scrobiculus cordis: they were likewise distinctly felt in the cardiac region. In some cases the heart's action is felt only in the scrobiculus cordis, and not beneath the left

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obstruction, and consequent hypertrophy of the heart. This affection has not escaped the observation of many practised observers. It has been well described by the late Dr. Graves, by Sir H. Marsh, and recently by Dr. Stokes, in whose pages the reader will find a very complete description of the disease—*Diseases of the Heart and Aorta*, p. 278.

The prominence of the eyeballs in these cases is probably due partly to actual enlargement of them, and partly, perhaps, to an enlarged or varicose condition of the orbital veins.

mamma; and in such there is no evidence of enlargement; for there may be, and probably is, some cause pushing the heart to the right side, so that the altered seat of the pulsations is due to change in the position of the entire organ. But when the pulsation of the heart is felt in both regions we have evidence of enlargement, and of its being, at least, the right ventricle that is enlarged; for while the left remains stationary in its normal situation, the right has extended still further to the right side. Those of you who accompany me regularly through the wards of the hospital may notice, that in all cases of dyspnœa I make it a rule to place my hand over the scrobiculus cordis to feel if I can detect any cardiac pulsations there. My attention is particularly directed to this point in cases of long-standing asthma, and never in these cases is it altogether absent; and especially if the asthma have produced emphysema, when there is not only expansion of the right ventricle by dilatation and hypertrophy, but a pushing of the whole heart to the right side from the enlargement of the left lung.

We noticed also in this case a friction sound accompanying the systole and diastole, heard below and to the left of the nipple, over a space very circumscribed in extent. There was no bellows-murmur to be heard, either at base or apex. A phenomenon, connected, in its indications, with the beating of the heart in the scro-

biculus cordis, was observed, namely, venous pulsation in the neck. This man has very large external jugulars, and you may see them pulsating distinctly even at some distance from the bed.

This phenomenon of venous regurgitation in the neck is due to a reflux of blood during the systole from the ventricle through the auricle into the venous system. In consequence of the obstruction in the lungs the ventricle, already considerably dilated, cannot completely empty itself, and ere long the tricuspid valve, becoming incapable of performing its office perfectly, allows some of the blood to regurgitate, and thus to escape through the auricle into the veins. The proper source of supply to these veins is from their distal extremity. If, then, you put your finger in the course of that supply,—that is, to some distal point where the pulsation is observed, —the vein ought to become empty, because its supply of blood is thereby cut off; but in this patient it does not; it continues full, and its pulsations persist; hence the waves of blood which produce the phenomenon of pulsation must be propagated from the cardiac extremity of the vein.

There are many cases of heart-disease in which the jugular veins do not pulsate, but merely remain full below the point pressed upon. In such cases there is regurgitation, but not to such a degree as to cause pulsation. When you press on

the external jugular vein of a healthy person, it will instantly become empty below the point of pressure; a slight dilatation of the right cavities is sufficient to allow of enough regurgitation to keep the vein full below the point of pressure; nay, I have no doubt that this may occur even under a dilating cause of quite a temporary nature, such as great efforts in lifting and throwing heavy weights, rowing, walking in a mountainous country, blowing wind instruments, &c. &c.

In extreme cases of venous regurgitation, when the cavities are permanently dilated, and the superficial venous system is well developed, the pulsation will be visible, not only in the jugulars, but in all the superficial veins of the neck and chest, and even in those of the arms. As regards the lungs, there was evidence in this case of œdema, in a certain degree of dulness on percussion over their bases posteriorly, which was most marked on the right side. Rhoncus and crepitus were also heard in these regions, but at the apices the breathing was distinct.

The liver could be felt extending slightly below the margin of the ribs; and there was ascites, dependent, no doubt, on the congested state of the liver. On examining the urine we found it acid, of specific gravity 1015, and heat and nitric acid gave evidence of the existence of albumen. When the fresh urine was allowed to stand, a scanty and flocculent deposit was formed, which, under the

microscope, was found to consist of blood-corpuscles, epithelium (chiefly renal), a few pus-cells, and a great many casts, for the most part granular and transparent, some containing cells loaded with oil-globules; but these last were not very abundant. Now this is a state of things under which we should not expect our patient to survive long; yet here we see him remaining very much in *statû quo*, if anything, indeed, a little improved, until the present time, (January 16th,) a space of two months from his admission.

Let us now analyse these symptoms more minutely, and endeavour to determine their nature and indications, and the conclusions which can be fairly deduced from them.

The *palpitation* was no doubt an irregular rate of action. When the heart beat quickly, he had what he called palpitation; when more slowly, the palpitation ceased. When patients speak of palpitation, they often mean different things; sometimes they signify by it deranged rhythm, either complete intermission, or irregularity of action; and sometimes, as in the present case, an increased rate of action without any derangement of rhythm. Our patient has not suffered from any remarkable rapidity of the heart's action, except in the above-mentioned temporary way.

Orthopnœa is almost always connected with imperfect circulation through the lungs. This imperfection of the pulmonary circulation may be

either primary, from disturbed action of the lungs, as in asthma; or secondary, from imperfect action of the heart. In asthma no doubt there is, frequently, an anatomical change in the lungs; but let me guard you against the idea that in this lies the essence of the disease. The primary affection in asthma is in the nervous system, or in the digestive organs, or both; irritation in the latter will produce the asthmatic spasm through the former, but primary irritation of the nervous system will equally give rise to it, under physical or even mental causes. But these frequent attacks of spasm may induce anatomical changes in the lungs (emphysema), which, if the attacks continue over a long period, may become permanent. When the heart is primarily affected, the embarrassment of the respiration, which is secondary, has received the name of *cardiac asthma*.

In connexion with the disturbed breathing we found *congestion* of the lungs. This no doubt was chiefly dependent on the heart, through the imperfect action of which the blood was thrown back on the lungs. To this the hæmoptysis is to be attributed; and it is most probable, if we could now examine the lungs anatomically, we should find indications of pulmonary apoplexy, and of rupture of pulmonary vessels, in the characteristic currant-jelly-like spots.

The beating of the heart in the scrobiculus

cordis, and its interpretation, I have already referred to.

The *dropsy* is a result of which I shall say more by and by.

Diagnosis.—Now can we, from these general symptoms, make a diagnosis without reference to the physical signs? I think we can form a diagnosis which shall be sufficient for all practical purposes; and I recommend you, as a valuable clinical exercise, to endeavour to diagnose from symptoms before you have recourse to auscultation; for by so doing, your attention will be directed to the disturbed *functions,* and you may thus receive important suggestions for treatment. Those who direct their attention exclusively to physical signs often overlook these derangements of functions, and therefore miss some valuable indications which are not only of great value for treatment, but which give a greater insight into pathology.

Were I to proceed on the data afforded by the *general* symptoms alone in this case, I should diagnose first, *dilatation of the right side of the heart:* the pulsations of the jugulars, and the beating of the heart in the scrobiculus cordis, both indicate this. The pulsation of the jugulars, if proved to be regurgitant, is conclusive evidence of dilatation of the right ventricle; no other condition of heart is capable of producing this phenomenon. But we must be careful to prove that

the venous pulsation is regurgitant, as it may be due to other causes: it may depend on the impulse of the heart being transmitted through the capillaries; or it may depend on the contiguity of a large artery which communicates its pulsations to an adjacent vein; we must, therefore, be careful to determine its nature before we attach importance to its indications. Now, by making pressure on the vein, we obtain sufficiently conclusive evidence as to the nature of the pulsation. If the vein empty itself on the cardiac side of the point pressed upon, and yet the pulsation continue in the empty portion of it, we infer, and with the highest probability, that it arises from some contiguous artery; and this conclusion is rendered certain, if the pulsation ceases on stopping the circulation in the artery. If, on making pressure, the pulsation continue only on the distal side of the point of pressure, we may infer that the pulsation is due to the transmission of the pulse from the heart throughout the circulation, and especially if it be perfectly synchronous with the heart. But if the vein continues full between the point of pressure and the heart, then we know, whether there be pulsation or not, that that vein must receive blood from its cardiac side; and this it can only do by regurgitation from the right side of the heart.

You are doubtless aware that a slight regurgitation always takes place from the auricles into the veins in the normal state, and that this regurgitation is synchronous with the auricular systole.

But when the ventricle and auricle are dilated, the amount of regurgitation is increased in proportion to the degree of dilatation of the cavities: blood regurgitates from the ventricle into the auricle, and from the auricle into the veins.

The beating of the heart in the scrobiculus cordis is also indicative of dilatation of the right ventricle, because by its dilatation this cavity enters into the formation of the apex of the organ, and the apex thus enlarged extends to the scrobiculus. But before we can affirm that the beating of the heart in the scrobiculus is due to the dilatation of the ventricle, we must be careful to ascertain that there is no displacement of the heart, which may be easily determined by seeing that its impulse is felt in the normal, *as well as* in the abnormal, region.

So far, then, we may affirm, that our patient suffers from dilatation of the right side of the heart. Now dilatation does not arise spontaneously. There must be some dilating force, and that force is the backward pressure of the blood. When the muscular tissue of the heart is in a weak state, we can conceive that the walls of the ventricle may yield readily, without supposing any great increase in the ordinary pressure of the blood. But, in general, dilatation arises from some obstacle to the flow of blood from the ventricle; and in proportion to the resistance which that obstacle affords will be the backward pressure of the blood on the surface of the ventricle,—in other words, the amount of obstacle

will give the degree of the dilating force. In every case of dilatation of one of the heart's cavities, then, you must look for this dilating force,—this obstacle; and you will find it either at the orifice through which the cavity expels its blood, or in the capillaries of some important organ, or in some defective condition of the valves or the orifices of the heart. Dilatation of the *right* cavities of the heart rarely arises from diseases of their own orifices; for obstructive disease of these orifices is amongst the rarest of cardiac lesions. It is otherwise with the *left* cavities: experience tells us that the obstructions which the right ventricle has to encounter are either seated within the circulation through the lungs, or due to some derangement of the circulation through the left side of the heart.

There is yet another cause which may bring about dilatation as well as hypertrophy of the right ventricle, because it may produce the same change in all the cavities of the heart; that is, extensive or universal adhesion of the opposed surfaces of the pericardium. How it happens that obliteration of the pericardial sac can produce these changes, I do not attempt to explain; but that it does so, there can be no doubt.

Let us now inquire what may be the cause of the dilatation of the right ventricle in this case. I have said that the most common causes of this morbid condition are obstructed pulmonary circulation, or

obstructed circulation through the left side of the heart. The most common causes of obstructed pulmonary circulation are the asthmatic state, or chronic bronchitis, or that which is a frequent consequence of both the asthmatic state and chronic bronchitis—emphysema of the lungs. We have no indications in this case of any of these conditions. The history of the patient shows the absence of the one, and the physical signs demonstrate the absence of the other. Is there, then, any disease of the left side of the heart sufficient to create this dilatation?

On first seeing this patient, I hazarded a guess, from the character of the pulse, that there was *mitral* disease at the foundation of his malady. The peculiarity of pulse which suggested this notion was, that it was small, produced by a small stream, apparently inadequate to the size of the artery, and not proportioned to the action of the heart. Such a state of pulse does frequently co-exist with mitral disease; but so various are the conditions capable of producing a small feeble pulse, that a diagnosis based upon that sign only must necessarily be only a guess. Now such mitral disease might be either *regurgitant* or *obstructive*,—either of the two would affect the right side of the heart. And how?—By affording an obstacle to the return of the blood from the lungs. Whether the blood is unable to advance in consequence of a *contracted* mitral orifice, or whether

it flows back in large quantity into the auricle, through a patent mitral valve, it is evident that an impediment is offered to its passage from auricle to ventricle, and, therefore, to its return from the lungs to the auricle; and when this has continued some time, the right ventricle, being exposed to a degree of pressure greater than customary, yields, and gradually expands, until at length it assumes a permanently dilated state.

Is there mitral disease here? and if so, is it regurgitant or obstructive? The dyspnœa favours the idea that it is obstructive, because there is no form of heart-disease in which the dyspnœa is so great as in obstruction at the mitral orifice. Very often, when the disease is of this nature, sudden and terrible dyspnœa is the first evidence of its existence: the patient is suddenly awoke out of sleep by a breathlessness that seems as if it would kill him: he starts up in bed and gasps for breath till the paroxysm gradually subsides. Such a first attack is generally the precursor of similar ones, increasing in severity and frequency, only kept off by constant watching and the upright position, till at length the dyspnœa becomes constant, and the case terminates with pulmonary apoplexy.

But in the absence of this disease of the mitral valves, is there any other way of explaining the occurrence of the dilatation of the right cavities of the heart? The only explanation I can offer

is, that there are hypertrophy and dilatation of the left cavities connected with obstruction in some part of the systemic circulation, or dependent on adherent pericardium, and that the impeded circulation through the left cavities obstructs that through the right chambers, and induces dilatation and hypertrophy of them.

So far, then, for the indications afforded by the general symptoms: let us now turn to those other symptoms which, although not more physical than the former, are technically called *physical signs.*

A careful observation of the physical signs will serve to confirm or correct our inferences from the symptoms, and help us to adopt a more decided diagnosis. The physical signs themselves were these: extensive dulness over the præcordial region, indicating enlargement of the heart; the first and second sounds were found to be essentially healthy, and unaccompanied with bellows-murmur, as well at the base as at the apex. The absence of *bruit* at the base affords strong presumptive, although not positive, evidence that there is no *obstructive aortic* disease; also its non-existence at the apex denotes that there is no *regurgitant mitral* disease; for if there were, we should hear a systolic bellows-murmur in this situation—*i.e.,* unless the heart's action were very weak. It is only in a state of great feebleness of the ventricular contraction that there would be no bellows-sound where there is mitral regurgitation; but

with our patient the heart's action is not at all feeble.* Now, is there any diastolic bellows-sound to indicate obstruction at the mitral orifice? We find none. Are we, then, justified in denying the existence of disease of the mitral valve? Certainly we are not, for those cases of unquestionable obstructive mitral disease in which a diastolic murmur is heard are comparatively few: there must be a certain amount of force in the auricle for its production, and unless this exists the sound will not be heard. The value of this evidence, therefore, is merely negative: it does not prove that there is no obstruction at the mitral orifice, but only that the impulse given to the blood by the auricle is not sufficient to elicit a sound from the existing obstruction. So far, then, we receive really no aid in determining the question of the existence of obstructive mitral disease from examining the sounds of the heart. We have good reason, however, to believe that there is no mitral regurgitation; and

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* The existence of even a well pronounced mitral murmur, (*i. e.* of a murmur heard specially at the apex and beneath the left scapula,) is not conclusive evidence of mitral regurgitation. Extensive deposit on the infundibular surface of the inner segment of the mitral valve, causing roughness of its surface, will generate a bellows-murmur, which closely resembles that caused by mitral regurgitation. Many of the long existing mitral murmurs, which date from an attack of rheumatic endocarditis in early life, are of this kind.

as to the question of mitral obstruction, we have no further evidence than what the symptoms afford.

This evidence is undoubted as to the existence of obstruction; but it is not sufficient to determine the exact seat or nature of the obstruction. By the aid of auscultation we can determine that it is not mitral regurgitation: it may, however, arise from contraction of the mitral orifice, or from that general obstruction which the left heart has to encounter in the distal part of the systemic circulation.

Taking it for granted, then, that the circulation through the left side of the heart is obstructed, it is easy to explain all the other symptoms. The obstruction through the left side of the heart throws the blood back on the left auricle, and thence on the lungs, giving rise to the state of extreme pulmonary congestion in which we find our patient, and the consequent hæmoptysis. The obstruction at the lungs is propagated backwards to the right ventricle, which, in its efforts to overcome the opposing obstacle, becomes dilated and hypertrophied; the right auricle encounters corresponding difficulties to those which oppose the action of the ventricle, and it becomes similarly dilated and hypertrophied; and in consequence of the impediment which it has to encounter, the blood is thrown back upon and delayed in the venous system, and regurgitant venous pulsation and dropsy are the result. Thus we see all the symp-

toms fall in a retrograde succession, as the consequences of the obstructive force beginning at the left side of the heart, or in some part of the systemic circulation.

A feature of this case which practically is of most interest to us is the *dropsy*, because this is the symptom which generally and justly excites the greatest alarm in the minds of patients and their friends. I have already mentioned that the characteristic of cardiac dropsy is this, that it always takes place first in the most dependent parts: it does not begin, as we have seen other forms of dropsy, in the face and upper extremities. An aneurysm may cause dropsy of the upper parts of the body from pressure on the descending cava or some of its large tributary veins, but pure cardiac dropsy never comes on thus: the very fact of its not existing in the upper parts of the body suggests its cardiac nature.* We find it apt to vary in amount according to position; the erect or sitting posture favours its accumulation, and hence it is that it increases in quantity towards the end of the day, and disappears or diminishes in the morning from the recumbent position during the night. Still, it will appear in the upper extremities, but always late, and often more on one side than the other, being most abundant on that side which is the most dependent. This we have seen in our patient:

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* See Lecture V.

his left hand was the first affected; but lately we find he has been lying very much on his right side, and the consequence is that the dropsy has quitted his left hand, and accumulated in his right. We could not have a better proof than this of the purely mechanical character of the effusion.

Now what is the immediate cause of this dropsy? We have seen that the impediment to the circulation is propagated backwards from the left to the right side of the heart, and by its influence in the latter situation a considerable portion of the blood returning from the general circulation is pumped back into the veins at every systole: this obstructs the flow of venous blood throughout the body: the circulation is consequently impeded in the capillaries: these vessels become loaded, and the only relief they can obtain is by the filtration of the serum of the blood, or the liquor sanguinis, into the areolar tissue. If any part is dependent, a greater force is needed to send the blood through its capillaries, because the venous blood has to ascend against gravity: a greater accumulation is apt to take place both in the capillaries and in the veins; and, therefore, such part becomes affected with a greater amount of dropsy.

The access of dropsy is always a serious symptom, but not necessarily a fatal one. It may come on early or late. In some cases of purely cardiac disease in young persons, not complicated

with either kidney or liver disease, dropsy may come on early, from which the patient may recover completely, and life may be prolonged for some time, even although the cardiac disease continue. If a patient has had rheumatic endocarditis, and such impairment of the mitral valve as gives rise to regurgitation, the effect would be to obstruct the circulation first at the left, and then at the right side of the heart. Now the right cavities feel the obstruction at first much more than they would do afterwards: the left auricle, being slow to dilate, has not yet adapted itself to the deranged condition, and the whole force of the obstruction is thrown back on the lungs and on the right side, the cavities of which dilate easily, and thus dropsy becomes rapidly developed. In the meantime the left auricle dilates, the circulation through the lungs becomes less obstructed: there is, therefore, less obstruction in the right side of the heart, which gradually recovering itself, the dropsy diminishes.

In all cases, what seems to be necessary to the production of the dropsy, is the *dilatation of the right side of the heart.* I think my friend Dr. Blakiston, of St. Leonard's, was the first to point out clearly the importance of this condition. Dr. Blakiston seems to lay it down as a rule that venous regurgitation always precedes the dropsy. But dilatation may exist without regurgitation being manifest in the external veins: at least, I

think that the regurgitation need not exist to such a degree as to produce pulsation. I am now attending a case in private practice in which there is dropsy and undoubted dilatation of the right side of the heart, but no venous pulsation whatever, and I constantly witness many similar.

But there are certain other circumstances in this case, in addition to the condition of the heart, that predispose to dropsy: these are, a state of the blood in which the water is in undue proportion, and the solid ingredients diminished, and *renal* disease. When the blood is in such a condition as to favour dropsy, the other causes will act much more speedily than when such is not the case; and, no doubt, in the present instance, the dropsy came on much earlier in consequence of the impoverished state of the blood occasioned by the repeated attacks of hæmoptysis which our patient had suffered.

Reviewing, then, the whole case, we may sum up thus: that the primary cardiac affection consisted in a rheumatic endocarditis, which narrowed the aperture of communication between the auricle and ventricle, and thus obstructed the passage of the blood into the ventricle, throwing it back upon the lungs, causing pulmonary hæmorrhage, and dilatation and hypertrophy of the right cavities; or, in a rheumatic pericarditis, causing an extensive adhesion between the heart and the pericardium, and so far impeding the heart's play as to give rise

to hypertrophy of its walls, with dilatation of its cavities. Or that, from some obstruction to the circulation, either in the large arteries, or in some more distant part of the circulation (in the kidneys, for instance, from chronic disease in those organs), the left heart has suffered dilatation and some hypertrophy; and that, in course of time, the right heart has, in consequence of the obstructed circulation in the left side, become hypertrophied and dilated likewise. On the former supposition, the primary disease would be in the heart itself; on the latter, it would be in the kidneys, or some other part of the systemic circulation.

I have already alluded to the amaurosis with which our patient is afflicted. This affection most probably results chiefly from an anæmic state of the retina. Last summer we had in the hospital a remarkable case, which illustrated how loss of blood may produce amaurosis. The patient had suffered from violent hæmatemesis: after the last attack he completely lost his sight, and he remained quite blind afterwards, notwithstanding a variety of treatment to which he was subjected. In a case of this kind the nutrition of the retina is permanently damaged by the altered quality or quantity of the blood after such severe hæmorrhage, and it bears an analogy to those cases in which delirium or epilepsy follows excessive loss of blood, or occurs in extreme states of anæmia.

One thing I have omitted to mention, and that

is the pericarditis. At the time of our patient's admission, there was a very distinct rubbing sound over the region of the heart, which the next day had disappeared, and with its disappearance, there supervened aggravated dyspnœa, an undulating movement in the region of the scrobiculus cordis, synchronous with the action of the heart, increased extent of præcordial dulness, and feebleness of the cardiac sounds. We set down all these signs to the development of a large quantity of fluid in the pericardium; and, with the idea of getting rid of it, I applied a blister over the region of the heart, preceding it by a mustard poultice, and purged him well, supporting him at the same time with chloric ether. The good effect of this treatment was manifested by the disappearance of the symptoms just named, and the return of the rubbing sound. Now what was the cause of the pericarditis? This is very doubtful; but this we know, that renal diseases are very apt, through the contamination of the blood by the uneliminated urinary principles, to induce serous inflammations, and that this man was, at the time of the attack of pericarditis, labouring under such renal disease.

Treatment.—In the treatment of cases of this description your attention should be principally directed to the relief of the most urgent symptoms, and to strengthen the power of the heart. For the relief of the dropsy a great deal may be done by

attention to the position of the patient, and by the administration of diuretics. With the view of supporting his powers we gave our patient Baylis tonics and iron; and finding the kidneys acting imperfectly, we gave him digitalis. But in such cases it is desirable to be careful in administering this medicine, and it is a good plan to combine it with some tonic. I frequently combine it with ammonia, or give the tincture of digitalis with the tincture of the sesquichloride of iron. I cannot, however, say that any great benefit has resulted in the present case, either from the digitalis or the iron: that treatment was cut short by the supervention of the pericarditis. This, however, was subdued by very simple means—counter-irritation and copious discharge by the blister.

There was much difficulty in getting the kidneys to act, and the greatest benefit was derived from the bitartrate of potass, either alone or in combination with the pulvis jalapæ, or the compound powder of jalap. We also gave him lemon-juice, and found it acted freely on the kidneys for some time. The dose of lemon-juice was from half an ounce to an ounce several times a day.

Elaterium was also exhibited, but without any decided benefit. The dropsy has been kept down best by means of the acupuncture: the quantity of water that has oozed away from him, and the relief that he has obtained from it, is surprising.

In practising acupuncture in dropsical cases it is important that you should make the punctures at a considerable distance from each other, for each puncture is apt to become the centre of an erysipelatous inflammation, which spreads the more readily the nearer they are to each other. It must be confessed that with whatever care you make the punctures, the difficulty which you have to encounter arises from this erysipelatous inflammation, which sooner or later almost invariably follows.

There is another method of relieving anasarcous legs, lately revived on the Continent. Instead of pricking the legs at various points with the needle, a single incision is made above the inner malleolus, or in some other convenient position (not too near a vein or artery), cutting through the skin and subcutaneous tissue down to the fascia. The length of the incision may be from half an inch to an inch. The rapid flow of water which these incisions admit of, is encouraged by placing the patient in a sitting posture on the side of the bed, for a certain time during the day, with his feet placed in a tub. By this plan, the patient gains the treble advantage of increased rapidity of the escape of the fluid, the prevention of that sloppy and soaking condition which inevitably ensues when the acupunctures are allowed to ooze all day, and the ease to the breathing which results from the erect

position. There is less danger of sloughing by this process, as a single incision is enough for each leg. If this man does not materially improve soon, we shall adopt this expedient, and you will have an opportunity of seeing its effects.

Unhappily we can do little to restore the impaired action of the heart, but we may, often, do much to ameliorate the condition which that impairment entails. The principal indications are to support the patient's strength, to keep open the emunctories, and to adopt all the means in our power to get rid of the superfluous water.

LECTURE X.

On Ascites.

GENTLEMEN,—Before entering upon the consideration of the proper subject of this lecture, namely, that form of dropsy called Ascites, I must ask your attention to the issue of the case of cardiac dropsy, which we discussed in the last lecture. Our patient, Baylis, did not live long after we last met. The dropsy, despite of the various remedies employed, increased, the difficulty of breathing also became greater, fluid was effused into the pleuræ as well as into the abdominal cavity, and at length he died exhausted.

This is the fate of all patients suffering from mechanical dropsy when the cause is irremediable. So long as the cardiac difficulty remains, the mechanical cause of the dropsy continues to exist, and you have no means of obviating the accumulation of water save by establishing drains at various points, to carry off the accumulating fluid. Hence you begin by trying to excite the kidneys and the bowels, great vascular surfaces whence large quantities of water may be carried off. The continued application of the various stimuli which the materia medica afford, renders these surfaces

at length insensible to their further influence; they refuse to obey the stimulus, and cease to yield a sufficient quantity of fluid. It is then that you must have recourse to more direct means of evacuating the fluid from the areolar tissue in which it has collected. You will remember that in this case, having tried the acupuncture without any great benefit, we proposed to adopt the method of a single incision of about an inch in length in each leg.* The result of

* This method was originally suggested by the celebrated Mead, as I am kindly reminded by my friend, Dr. Gull. The following passage, in which Mead describes his mode of procedure, deserves well to be quoted. "In the leucophlegmatia, an incision ought to be made in the inside of the leg, two fingers breadth above the ankle, as far in as the cellular membrane and no farther; in order to serve as a drain for the water, which should run for some days. And during this time let the leg be fomented with a decoction of emollient and warm herbs, with an addition of camphorated spirits of wine, which method I have often found to be of great service, not only in this species of dropsy, but even in the ascites itself; nay, in some cases it has proved an absolute cure by drawing off an incredible quantity of water for many days together. But care must be taken, not only in this particular incision, but in all others that are made in any part of the body for drawing off the waters, not to over-exhaust the patient's strength; which is as much affected by this evacuation as if the same quantity of blood were drawn. Wherefore the patient is to be supported by all possible means, lest what was intended for his cure may hasten his death; whereof I have seen two instances, one of which,

this treatment was as follows:—Immediately after the operation, the patient was made to sit up with his feet in a tub into which the fluid drained. In a couple of hours, twenty-eight ounces of serum were discharged in this way. Two days afterwards a pint of serum was obtained, and for eleven days the legs continued to discharge at the rate of about eight ounces each day. The edges of the incision then became covered with lymph and sloughy, and this diminished and ultimately stopped the discharge. The dropsy, which under the first escape of fluid had decreased, now quickly increased, and the patient became rapidly weaker, and died on the 3rd of February, nearly three months after his admission into the hospital, and more than four months from the supervention of the dropsy. The practice was so far successful that it evacuated a good deal of fluid, and seemed to prolong life for some days; but it was tried rather too late, and under unfavourable circumstances, caused by the inflammation which had already been excited in the limbs by acupuncture. The case was, therefore, an unfavourable one for trying this mode of proceeding.

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indeed, happened by my own fault, in not estimating the patient's strength with sufficient caution, and the other by the rashness of a surgeon. And yet it is astonishing, how great a quantity of water, drawn off in this manner, hydropicks sometimes bear to lose with ease and benefit." —*Mead's Medical Works*, 1767. P. 387.

The post-mortem examination showed effusion into both pleural cavities, and into the peritoneum. The cavity of the pericardium was entirely obliterated; in greatest part by means of *old* adhesions, the result of old pericarditis; but by *recent* adhesions, also, over a portion of the anterior surface of the heart, towards its left side, which you will remember was the seat of the rubbing sound, heard for some time after his admission. The former attacks of pericarditis had obliterated the greatest part of the cavity of the pericardium, leaving a small portion in front, which became the seat of the recent pericarditis.

Our diagnosis was quite correct as far as regards the condition of the walls and cavities of the heart. We found dilated and hypertrophied cavities on both sides. This diagnosis was indicated both by symptoms and by physical signs, and therefore we were not likely to be mistaken. But there were no unequivocal signs of valvular disease, and consequently we could form no positive opinion as regards their condition.

The post-mortem inspection showed that the primary disturbing cause of the action of the heart was the almost total obliteration of the pericardium by adhesions due to an attack of pericarditis eleven years ago. During all that time the heart had been bound by these adhesions, instead of moving freely in its proper serous cavity. Its contractions were doubtless, therefore,

laboured, and the contents of its cavities were probably not always completely expelled; and hence, in time, all those cavities became dilated, and their walls hypertrophied.

The condition of the kidneys was what we expected to find: they were contracted as the result of chronic disease. The cortical portion was much wasted. Many of the tubes were filled with altered epithelium and granular matter; others with fat: and others were empty and shrunk.

You noticed the immense effusion of water which existed in the pleural cavities, and how this water compressed the lungs, so as to solidify a considerable portion of these organs. This effusion must have taken place within a few hours of the fatal event, as I doubt not often occurs in other cases; for we examined the chest only three days before death, and found distinct breathing audible at every part. How remarkable the obstructing cause, which could give rise to the exosmose of all this fluid in so short a time!

Let me now call your attention to some examples of another form of dropsy—namely, ascites, or dropsy of the peritoneum, which have lately been under our observation.

Case XXIX.—The first case of which I shall speak to-day is that of a man named John Murray, æt. 55, who had been for several

years a butler in a gentleman's family. This case is especially interesting as affording an instance in which the dropsy was on one occasion completely removed by the aid of internal remedies; and on a second, almost so; and in which, in consequence of the subsequent death of the patient from another cause, we had an opportunity of examining the condition of organs upon which the dropsy depended.

This patient was a stout, portly man, just such a person as you would expect a gentleman's butler to be. He stated that he had always enjoyed good health, and professed himself to be strictly temperate. This, no doubt, was true; but probably he kept the key of his master's cellar, and possibly may have thought it his duty now and then to taste his wines. He drank beer, and took no great amount of exercise; and thus the seeds of disease were slowly, and gradually, and imperceptibly sown, so that he did not observe anything wrong with him, until dropsy had already developed itself in his abdomen, which began to swell by reason of the accumulating fluid. He first noticed the swollen state of the abdomen three months before his admission.

On Murray's admission into the hospital on the 28th of August, 1848, his abdomen was quite tense with fluid, and fluctuation was most distinctly felt. His legs, too, were œdematous. No exact information could be obtained as to the

state of the liver, owing to the tension of the abdomen. There was, however, an irregular and feeble action of the heart, which led us to fear that the liver was not alone at fault in the production of the dropsy.

During the three months before his admission our patient complained only of what he called a fluttering in the region of the stomach, and a gradually increasing dyspnœa. The fluttering was doubtless a sensation caused by irregular action of the heart.

The action of the heart consisted in a series of short systolic contractions succeeding each other at irregular intervals, and evidently of very different degrees of strength; some being felt distinctly at the pulse, others exciting no pulsation in the artery, or only a very feeble one. The sounds of the heart were feeble, but uncomplicated, save by a slight bellows-murmur accompanying the first sound, and heard at the apex.

There was not much amiss with the urine; it was rather high-coloured, but did not deposit any sediment, nor did it contain albumen.

Having tried for a few days the bitartrate of potass without advantage, I determined to bring the patient under the influence of mercury, and to combine with it digitalis in small quantities, carefully watching the state of the heart, in consequence of the weakness of that organ. He was accordingly ordered one grain of powdered digi-

talis with one grain of squill, and two grains of blue pill thrice daily; and a few days afterwards ten grains of the strong mercurial ointment, and the same quantity of the compound iodine ointment, were directed to be rubbed in over the region of the liver twice a day.

In the course of three weeks there was a marked diminution in the quantity of fluid in the abdomen; the kidneys were excited to very free action, so that they secreted not less than from four to five pints of urine per diem. As the mouth had become sore in about a fortnight, the pill was ordered to be taken only once a day, and the frictions were continued. With these remedies was combined pressure on the abdomen by means of a bandage.

Under the influence of these remedies the patient rapidly lost all his dropsy, and went out quite cured *as regards it,* on the 19th of October, that is, in about seven weeks; the feeble and irregular action of the heart continuing much the same. The removal of the fluid enabled us to feel the liver enlarged and indurated, but without any irregularities upon its surface.

Unfortunately, soon after he left the hospital Murray was exposed to cold, and suffered an attack of bronchial catarrh; the dropsy returned, and he was re-admitted on the 11th of November, only three weeks after his discharge. Upon his re-admission we had recourse to the same treat-

ment as that previously adopted, with the same beneficial results. We again applied the iodine, mercury, and pressure: and in addition to this we gave him taraxacum, with manifest advantage. All his symptoms had improved, and the ascites had almost disappeared, when he was exposed to the contagion of erysipelas, at that time raging with great virulence in the ward. He vomited several times and shivered, and had sore-throat, which was followed by an extensive bronchitis affecting the small tubes; the respiratory mucous membrane having been, I have no doubt, the seat of an erysipelatous inflammation. Under the cough, difficulty of breathing, and excessive secretion produced by this affection, he rapidly fell into a very depressed state, and died suddenly in the night.

On examining the body, we found that the liver was considerably enlarged, and Glisson's capsule was much thickened, both around and in the substance of the organ. There was great dilatation of all the cavities of the heart, especially the right; and a good deal of deposit of fat upon and among the fibres of the heart, which seemed weak and ill-nourished, giving this organ a soft flabby appearance. It is very possible, also, that there may have been fatty degeneration of some of the fibres; but as the heart was not examined microscopically, we cannot speak positively upon this point. The orifices of the

ventricles were both dilated, and the mitral valve was shrunk and thickened at its margin, so that there can be no doubt regurgitation took place at the mitral orifice during life: this explains the bellows-sound.

In this account of symptoms and morbid appearances you have the history of a large number of cases. Either the morbid state of heart, or the chronic disease of the liver, may take precedence; or the two diseases may come on simultaneously. It is probable in this case that the liver was the first organ to go wrong; and this is indicated by the nature of the dropsy, which was mainly confined to the belly, the œdema of the lower extremities being the only dropsy referable to the heart; but this may ensue upon an ascites of long standing, even when the heart is not diseased. The heart had not yet acquired that degree of dilatation necessary to the production of extensive cardiac dropsy. The condition of this man, then, was as follows: he had a weak fatty heart, and consequently a feeble circulation; chronic disease of the liver was established, and the course of a large portion of the blood of the body, that, namely, of the intestinal canal and the spleen, became seriously impeded. This embarrassed the heart, which, in consequence of the obstructed circulation at one point, experienced a gradual dilatation. The obstruction to the circulation in the liver determined, so to speak, the

dropsy to the peritoneal cavity, and the increasing dilatation and weakness of the heart tended to render it general. In such cases, if the disease of the liver has not yet gone to the production of contraction of Glisson's capsule, diet, the antiphlogistic treatment, &c., may relieve the congestion of the liver, and diminish the obstruction to the circulation, and rest may enable the heart to recover itself somewhat; the state of dropsy may be removed, and the patient may, as in Murray's case, temporarily recover; but the occurrence of any new cause of disturbance of the circulation, as, for example, the bronchial catarrh in his case, may renew the embarrassment of the heart, the dropsy may again be determined to the abdomen by the obstructed hepatic circulation, and all the old symptoms may return, to be again relieved by a similar plan of treatment to that at first adopted.

Case XXX.—The second case to which I shall call your attention is that of Elizabeth Whiteman; this, like the other, terminated fatally, and we can therefore speak pretty decidedly as to the exact nature of the diseased conditions. The patient was forty-five years of age, and had had eleven children. In this case there was much more evidence of the existence of intemperate habits than in that of the butler, to which I have just referred. As so frequently happens, however,

she declared herself to be a very temperate person, but admitted that she was in the habit of taking a pint and a half of beer a day, and one or two glasses of gin. About twelve years ago, being then thirty-three years of age, she threw up a large quantity of florid blood. It is difficult to determine, at this distance of time, whether the blood was vomited or coughed up—whether it was a case of hæmatemesis or hæmoptysis. The florid colour favours the latter supposition; but although in hæmatemesis the blood is generally black, it is not so always, for it may be thrown up at once, and then it may be as florid as if it came from the lungs. The colour of the blood is usually dark in hæmatemesis, because when hæmorrhage takes place into the stomach, the blood is apt to accumulate in that viscus for some time before it is cast up, and then it becomes mixed with and blackened by the secretion of the stomach. In the lungs, on the contrary, it is expelled immediately after its escape from the blood-vessels; or, if it remain in the lung, it is exposed to currents of air. Six years afterwards, this patient appears to have *vomited* a quantity of *black* blood; and the attack of vomiting was preceded by pain in the scrobiculus cordis, and followed by severe retching. It is evident that on this occasion the functions of the stomach were much impaired, either primarily, or most probably as a consequence of disease of the liver. Five years before her ad-

mission she had a severe fit of rheumatic gout, affecting nearly all her joints; and two years afterwards she had another similar seizure. About a month before her admission into the hospital she began to suffer from attacks of retching, with excessive flatulence and spasms of the stomach, —symptoms evidently denoting great derangement of the stomach, and due probably to irregularities of diet and intemperate habits. At this time she also began to pass urine of dark colour, diminished in quantity, and depositing an abundant brick-dust sediment. Her abdomen began to enlarge at its lower part, and she suffered pain in the loins. Shortly afterwards her legs showed signs of dropsy.

On her admission we found very distinct evidence of ascites in the enlarged and fluctuating abdomen. Percussion elicited a clear tympanitic sound over the region of the stomach, indicating that this organ was much distended by flatus. The patient was greatly emaciated, her skin was sallow, and there was a distinct yellow hue of the conjunctivæ. She also exhibited another symptom (and it is one of great interest, and not uncommon, but which was not so clearly marked in the last case I narrated to you), in a great enlargement of the veins coursing over the abdomen—the superficial epigastric veins. You know there is a communication at one or two points between the veins contributing to form the portal

vein and the systemic veins; and when the circulation through the liver becomes retarded, some of the blood of the portal system is thrown on the vena cava inferior, and through it on the superficial veins of the abdomen, which, naturally small and scarcely visible, become meandering blue lines, or even prominent vessels of considerable magnitude.

In this case, the patient being a woman, we had to make the diagnosis between ascites and ovarian dropsy,—a diagnosis which is, generally speaking, not very difficult, and for which the simple process of percussion is ordinarily sufficient. In ascites, the percussion-sound is clear in the centre of the abdomen, and dull in the flanks; in ovarian dropsy the dulness exists over the whole extent of the tumour. But in some cases of ascites the length of the mesentery is not sufficient to allow the intestine to float to the top of the accumulated fluid, and then you will have a universal dulness similar to that in ovarian dropsy. In such a case you must resort to more indirect and collateral evidence for supplying the data of your diagnosis,—the history of the case—the mode in which the dropsy commenced; if it began on one side, and gradually extended—the presence or absence of evidence of hepatic disease, or of some other abdominal lesion calculated to impede the portal circulation.

It is not very likely that the condition of preg-

nancy would be mistaken for ascites, or *vice versâ*. But we know that women labouring under ovarian dropsy have been accused of being pregnant, and their characters damaged; and, on the other hand, I have heard of a pregnant woman being pronounced the subject of ovarian dropsy, and prepared to be tapped.

A thin walled uterus with a superabundant quantity of liquor amnii may give the signs of an unilocular ovarian cyst. The same signs which would distinguish such a cyst from ascites ought to prevent your mistaking such a gravid uterus for that form of dropsy. And, in examining abdominal enlargements, you must always keep in view the signs and symptoms of pregnancy. Now and then young women seek and obtain admission into hospitals, trying to evade the detection of their friends, under the pretext of abdominal dropsy, or enlargement from some other cause.

The symptoms under which our patient Whiteman laboured did not appear in any degree to yield to the treatment which was pursued. She was mercurialized, and various diuretic remedies were administered; but the urine became less and less in quantity, she was frequently sick, and she became much weaker, and sunk gradually, apparently from exhaustion and insufficient nutrition, in a fortnight after her admission.

On the examination of the body we found the peritoneal cavity filled with a yellow serous fluid. The liver was *contracted,* and slightly tuberculated on its surface. The capsule of Glisson was so much thickened as to give a peculiar distinctness to the lobulation of the liver. When you consider how intimately connected the portal veins are with the capsule of Glisson, how that structure accompanies and envelopes them throughout the greatest part of their course, you may easily understand how its thickening and contraction must interfere with the free passage of blood through these vessels. Many of the cells of the liver were loaded with fat, but others were quite devoid of it, as if starved. The heart was small; the kidneys were healthy, but their blood-vessels much congested.

Comparing this second case with the first, we find ascites existing in both, but in the first connected with *enlargement* of the liver; in the second, with *contraction* of that organ. In both, Glisson's capsule was altered and thickened, and thus there existed in both the condition most necessary for the retardation of the portal circulation, on which the ascites depends. You may have enlarged liver without ascites, as in the simple fatty liver, or in the waxy liver, or in some cancerous livers, or in those which seem to owe their enlargement to dilatation of the ducts. I suspect that the condition which determines the

existence of ascites is thickening of Glisson's capsule, and that if this structure be thickened and altered, then ascites is produced whether the liver be enlarged or contracted. And I think it may be laid down that ascites is much more untractable when the liver is contracted than when it is enlarged. Some, indeed, suppose that the contracted liver is an advanced stage of the same disease which creates enlargement of that organ; but the evidence in favour of this view appears to me to rest on very slender grounds. I know of no satisfactory evidence to prove that, in any given case, the liver has passed in succession through the stages of enlargement and contraction; although, beyond doubt, a very large liver admits of reduction, yet not in the manner and to the degree commonly described. A similar question arises as regards Bright's kidney,—is the enlarged mottled kidney an early stage of the contracted kidney? You are doubtless aware that there are the strongest reasons for answering this question in the negative, and that there can be now no doubt that these two different states of kidney are essentially different diseases, both producing a common effect, namely, albuminous urine. So, also, it is highly probable that the enlarged liver, with thickened Glisson's capsule, is a different disease from the contracted liver, although both produce ascites; and not only so, but of the four cases of enlarged liver, all giving rise to very simi-

lar phenomena, each may exhibit a different phase of morbid change.

Case XXXI.—The third case of which I shall speak to-day—that of Sarah Gadd, æt. 66,—differs from those I have just related, in the absence of that condition which in them was the most significant and important, and, doubtless, the cause of the dropsy, namely, the thickening of the capsule of Glisson. On her admission, there was no doubt as to the existence of ascites; but the previous symptoms were by no means urgent, and the dropsy had come on without any of its usual premonitory signs. There was no sallowness; the liver could not be felt, nor was there any symptom to give information as to its condition. There was, however, the negative evidence of the character of the urine, which contained no undue quantity of lithates; and this was so far favourable, as it denoted the probable absence of any severe organic hepatic disease.

This patient was under treatment for a long time. We gave her diuretics, especially the bitartrate of potass; and also applied the iodine and mercurial ointment, and pressure. Under this treatment the urine increased in quantity, and the size of the belly diminished, but not so much so as to bring to light any enlargement of the liver, or the existence of any other tumour. In spite of this alleviation of the most prominent symptoms, the woman

became gradually weaker and weaker (still passing a fair quantity of urine), till the night of the 9th of February, when she died suddenly. The only particular symptom that could account for her sudden sinking was a cough which she had for a day or two before her death; but this seemed quite inadequate to such a result; at any rate, the treatment could not have pulled her down, as we were giving her citrate of iron and other tonics at the time.

You will remember that I had already expressed the opinion that no hepatic disease existed; and that I stated my suspicion that some deep-seated tumour, possibly of a cancerous nature, would be found external to the liver, compressing the portal vein or some of its principal tributaries, and thus impeding the circulation through the intestinal veins, and causing peritoneal dropsy. When I heard of her sudden death, the possibility of her having some internal cancerous disease was much more strongly impressed upon me; and when we came to examine the body, we found it to exist in much greater quantity than I had at all anticipated.

The diagnosis in this case was extremely obscure and difficult, for we had no definite symptom to guide us except the dropsy. This, by its situation, denoted an impeded abdominal circulation either within or external to the liver; but we had no sign of hepatic disease. There was sufficient evidence to

show that the woman's habits were not intemperate; the kidneys performed their office sufficiently, and the urine was on the whole normal, although latterly it had from time to time precipitated crystals of uric acid in the form of grains. There was no evidence of disease of any other organ, whether abdominal or otherwise. Thus, then, we had a good deal of negative evidence; all the positive evidence was the dropsy, and its persistent resistance to all remedies, denoting a persisting cause. The deposition of uric acid somewhat favoured the suspicion of malignant disease, but afforded no positive information.

On opening the abdomen a large quantity of a transparent somewhat viscid fluid escaped. The great omentum appeared shrivelled up, and converted into a solid cancerous mass, which adhered closely to the intestines and to the peritoneum, on the posterior wall of the abdomen. This tumour must have pressed upon the mesenteric veins, and probably also upon the trunk of the portal vein itself, so as to cause engorgement of all that part of the venous circulation of the viscera which was on the distal side of the pressure, and thus mechanically to give rise to the effusion. There was a cyst, about the size of a small orange, attached to each ovary; and the interval between each of these cysts and the other pelvic viscera was filled by cancerous growths, so that all these organs were capable of being removed in a mass.

The cancer was doubtless peritoneal, and probably originated in that part of the peritoneum which is connected with the ovaries. The liver itself was not diseased; the capsule was a little thickened, but only superficially, and not that portion of it which penetrates into the substance of the organ.

Now here was a very interesting cause of the dropsy, namely, the mechanical impediment to the return of blood from the abdomen to the liver, while the circulation of that organ itself was not at all impeded. The difficulty is to distinguish between this particular cause and the other to which I have before referred, namely, *intrinsic* obstruction of the portal circulation by disease of the liver itself; that, in the present case, I would call, for the sake of distinction, *extrinsic*. I know of no unequivocal sign of this condition but that of feeling the tumour. The cachectic aspect of the patient, and a decided or rapid emaciation, would doubtless excite suspicion; the deposition of uric acid, too, in a diathesis not gouty, would also increase my fears of malignant disease; but from these points we could merely guess, and, short of manual examination, I know of no sure foundation on which to build a diagnosis. Of course, the evidence of the absence of disease in other organs is valuable; and we should be greatly aided if we could detect cancer in an abdominal or pelvic viscus; and our suspicions would be confirmed if the history of the

patient showed that cancer had existed in former members of the family.

The sudden death of this patient, as I said, excited my suspicions of cancer; and the reason it did so was, that I have known several cases of cancer end in a similar way; the patient suddenly sinks when perhaps you least expect it, and without anything manifest to account for it. This woman, indeed, had been suffering for some days from difficult breathing, caused by the accumulation of fluid in the abdominal cavity; and this, no doubt, hastened her end. But we left her tolerably well the day of her death, and it was proposed to tap her; and I scarcely think that the distension was sufficient to explain the sudden change. It strikes me that, in these cases, a certain quantity of cancerous matter passing suddenly into the circulation may cause a great depression of the powers of life, and that the patient may die poisoned, just in the same manner as when the blood is contaminated by pus in cases of pyæmia. In a particular class of puerperal cases death often occurs very suddenly in this way, the patient passing from a state of comparative health to death in the course of a very few hours; the source of the purulent infection being the surface of the uterus and the uterine veins.

That you may not conclude that ascites, although very serious, is always fatal, let me add

one more case, in which the dropsy did not kill, but yielded under the treatment adopted.

Case XXXII.—William Jenkinson, æt. 34 (vol. xxvii. p. 127), admitted May 12, 1849, about a month after Easter. He was the "hammerman" of a smith's forge, and worked hard; he confessed that he drank hard also, rum (a highly alcoholic liquor) entering largely into his potations. Nevertheless he had been generally a healthy man, and had never been kept from work except by drunkenness. Eighteen months ago, however, he had chest symptoms somewhat resembling phthisis, and was on two occasions an out-patient at this hospital for them, and recovered to a great extent, a cough however remaining. On Good Friday he ate largely of hot cross buns and drank ale freely, and afterwards suffered very much from pain in his abdomen, which swelled considerably; the urine for two days was almost suppressed. This secretion became soon re-established without any medical treatment, and the swelling subsided. Some days afterwards he found the abdomen again much swollen and very painful, and on this occasion he came into the hospital.

On his admission the abdomen was found swollen and tense, and there was a distinct sense of fluctuation at every point; it measured thirty-three inches round at the level of the umbilicus; it was likewise tympanitic; much pain was com-

plained of in the loins and on the abdomen, which was very tender to the touch. The chest-sounds and those of the heart were natural. Pulse hard and quick, 100. Bowels much confined. There was no tenderness in the region of the liver, nor were the abdominal veins enlarged. Urine, about a pint and a half in the twenty-four hours, high coloured, specific gravity 1025, acid, no sediment, no albumen.

In the absence of any evidence of diseased liver in this case, and with the existence of so much abdominal pain, I referred the dropsy to subacute peritonitis, and determined to treat the patient accordingly. Opium and mercury, in the form of blue pill, were at once given. I deferred interfering with the bowels for a day or two; on the third day they were opened freely by enema. Half a drachm of mercurial ointment was rubbed in over the region of the liver every night. Under this treatment the kidneys soon began to act much more freely, and their increased secretion was favoured by small doses of the bitartrate of potass. In a week (on the 24th May) the mouth became sore; still he continued to take two grains of blue pill every night, but the rubbing was discontinued. On the 26th the abdomen was softer and smaller, the mouth being still sore. On June 2nd all fluctuation had vanished, and the swelling of the abdomen had disappeared.

The urine being scanty, and containing uric acid in large quantity, he was ordered to take two drachms of phosphate of soda every morning. Under this treatment the urine increased, and the quantity of uric acid diminished. He improved steadily, and left the hospital the last day in June.

I must briefly relate one more case, in which the operation of tapping was very successful.

Case XXXIII.—Mary Smith, æt. 40, admitted June 21, 1852 (vol. xxxviii. p. 9), has had four miscarriages at early periods. Her last confinement was five months before her admission, when she gave birth for the first time to a living child. Six weeks after her confinement dropsy showed itself in her face, legs, and belly; the urine became scanty, and she suffered from frequent micturition at night. On admission she had a sallow complexion, great enlargement of the abdomen, and dropsy of the lower limbs. The heart's action was faint and feeble, and there was an increased extent of dulness over the præcordia. There was distinct fluctuation in the belly, which measured forty-nine inches round. The urine was smoky, and coagulated freely with heat and nitric acid. There was no jaundice; the stools were natural in colour, and the urine free from bile. The ascites in this case seemed connected with the state of the kidneys, of which it was difficult to determine the precise

condition, as we had no means of deciding how long the albumen had been present. It was in all probability an acute state supervening upon a chronic one of some duration; some epithelial and granular casts were found, and at the same time there was some impediment to the circulation through the liver. Acting on this view, diuretics and drastic purgatives were administered; calomel, squill, and digitalis were cautiously given, and also the bitartrate of potash, with occasional doses of the compound powder of jalap.

After a fortnight of this treatment, the only change observable was a slight diminution in the size of the abdomen, which was also a little softer. The urine was increased in quantity to rather more than two pints and a half, specific gravity 1007.

On the 10th July, flannels soaked in a strong infusion of digitalis were applied to the abdomen. The urine, which had reached four pints on the previous day, continued to flow at this rate, but no material reduction took place in the dropsy.

On the 15th the digitalis fomentations were left off, and elaterium was given in doses of a quarter of a grain of the extract every alternate morning, and an ounce of the infusion of digitalis thrice daily.

No improvement took place from these remedies, and, from the occurrence of great faintness,

it was found necessary to diminish the dose of the digitalis four days after it was first administered. On the 8th of August the muriated tincture of iron was prescribed instead of the other remedies.

On the 16th no improvement had taken place; the abdomen was larger and more tense, and the quantity of urine, which had risen to five pints in the twenty-four hours, had now fallen to three pints.

A fair trial having been given to some of the best diuretics, and the patient having begun to suffer from the distension of the abdomen, it was determined to tap her. The operation was performed by Mr. Fergusson, and thirty-six pints of a yellow, slightly alkaline fluid, were drawn off. This fluid had a density of 1010, and was rendered nearly solid by heat and nitric acid. A full opiate was administered immediately after the operation.

On the 18th there was much tenderness of the abdomen, and the pulse was 104; on the 19th these symptoms had very much subsided, and she passed five pints of urine, of specific gravity 1012. On the 20th, in the forenoon, she complained of severe pain in the left lumbar and hypochondriac region; and at the usual visiting hour, two o'clock, we found her in a state of collapse, with great increase of the pain, pulse very small, 100, respirations 30, skin cold with a clammy sweat;

she was ordered to have more warmth applied to the legs, a large mustard poultice to the abdomen, and half an ounce of brandy every hour, with one grain of opium and one grain of calomel in a pill every two hours. In addition to this, ammonia with citric acid in effervescence was exhibited, three grains of ammonia being allowed in excess at each dose.

This treatment had the desired influence; on the 21st she had rallied considerably, the pain was subdued, the pulse had fallen to 80, respirations 20, and four pints of urine had been passed. The effervescing medicine was continued with a little opium every sixth hour, but the calomel was given up.

From this time no unfavourable symptom showed itself, with the exception of a slight diarrhœa, which was easily subdued. The pulse fell, and all fever ceased. From four to five pints of urine were secreted daily. The abdomen showed no disposition to swell, and there was not the least indication of the accumulation of fluid in it.

On the 9th of September she seemed perfectly well; a microscopical examination of the urine detected fatty casts and some large crystals of uric acid.

This woman continued in the hospital under close observation until the 9th of October, being fifty-three days from the tapping. During all that time no sign of any return of dropsy was

apparent. She was discharged apparently quite well, but still passing a small quantity of albumen in the urine.

Here, then, are various cases of ascites which I have thought worthy of your attention, as pointing out that that particular form of dropsy—peritoneal dropsy or ascites—has its origin in obstruction to the portal circulation, although not always in the same parts of that circulation. We see, also, how it may be associated with other forms of dropsy, either when, as in the butler's case, the heart is acting imperfectly; or when the kidney is diseased; or when, from the long continuance of the peritoneal effusion, pressure on the ascending cava impedes the return of the blood from the lower extremities.

Of the causes of ascites by far the most frequent is disease of Glisson's capsule, or of the liver itself. 2nd. Disease of the peritoneum is not an unfrequent cause, either chronic peritonitis, or tubercular or cancerous disease of the peritoneum; but these seldom cause extreme distension of the abdomen, unless the morbid mass presses very much on the portal vein or some of its principal tributaries. 3rd. Tubercular disease of the mesenteric glands, when the morbid deposit causes such enlargement of them as to form a tumour, which compresses the mesenteric veins. 4th. Enlargement of the spleen, too, is apt to pro-

duce ascites, but seldom, I think, to any great extent; as the spleen has an extraordinary power of adapting itself to changes in its circulation, and likewise because its position does not enable it, when enlarged, to exercise great pressure on the other tributary veins of the porta. 5th, I have seen, also, an instance in which an enlarged kidney appeared to give rise to ascites. 6th. Acute peritonitis will produce ascites: this is of a different nature from those previously mentioned, and falls more under the category of acute dropsy. The peritonitis induces an undue accumulation of blood in the capillaries beneath the peritoneum, and the dropsy takes place as a consequence of this congested or sub-inflammatory condition. To these causes of ascites I would add another *probable* cause, namely, temporary enlargement of the mesenteric glands. I have seen a few well-marked cases of ascites in children which recovered perfectly under treatment. The constitution of the patients and the symptoms, which resembled those of mesenteric disease, led me to attribute the ascites to a temporary enlargement of these glands.

Lastly, in the dropsy from acute irritation of the kidneys, whether from exposure to cold or from the scarlet-fever poison, effusion into the peritoneum or ascites may occur.

Let me now call your attention to one or two conditions which are liable to be mistaken, and, indeed, have been mistaken, for ascites.

Sometimes we find in ovarian dropsy that there is a clear tympanitic sound all over the tumour; this may be caused by the development of gas in the cyst, either through a process of decomposition of its fluid contents, or by a kind of secretion, as when the bowels generate gas, but more commonly, I think, when a communication is formed between the tumour and the bowel, and the flatus from the latter gets into the ovarian cyst. A short time ago there was an interesting example of this in the hospital. A woman, having all the signs of ovarian dropsy, was tapped three or four times: there had been dulness over the whole of the tumour, and there was no doubt about the nature of the case; suddenly the tumour became perfectly tympanitic; on opening the body after death, a communication was found to exist between the ovarian cyst and the intestine, through which flatus from the latter had escaped into the former, and had thus given rise to conditions which made the case, as regards the results of percussion, resemble exactly one of ascites. If the entrance of flatus had occurred earlier in this patient, the diagnosis would have been extremely difficult.

Ascites, with very tympanitic bowels, would present similar signs to those present in this case.

There is another source of fallacy which may be mentioned, as it was one into which John Hunter fell. Sir Everard Home mentions that that great surgeon and physiologist once tapped a

distended bladder, under the idea that it was a distended peritoneum. We know that patients are very apt to allow their urine to accumulate, especially when they are unable either to feel acutely, or to communicate their wants, as is often the case in fever. The only symptom of the commencement of this distension may be that the patient passes a restless night: the medical attendant, perhaps, does not look for the real cause, and by and by the bladder becomes so distended as to fill the whole abdomen. Now you can easily understand how it would be very difficult to distinguish such a state from ascites. You should always ascertain in such cases how the urine is passed; and if this be in such a manner as to leave any doubt, you should at once pass a catheter.

There is only one other condition that occurs to me as possibly mistakeable for ascites, and that is an enormously distended stomach. To what an extent this distension may take place we had an opportunity of seeing not long ago, in a woman who died of chronic gastric disease. The stomach was so much enlarged, that it filled the whole anterior part of the abdomen, all the other hollow viscera being compressed behind and below it. Such a stomach, filled with fluid, may produce fluctuations very analogous to those of ascites. The way to put the matter beyond doubt is to excite vomiting, and cause the ejection of all

the contents of the stomach: if the undulating fluid had been in the stomach, the fluctuation will immediately disappear. An interesting case of this kind occurred to me a little time ago in private practice; and I ascertained the nature of the fluctuation by visiting my patient the next morning before he had taken anything, when I found that this condition had entirely vanished. Very dilated small intestines, filled with liquid, would yield the sense of fluctuation, as I have often noticed in cases of long-continued internal obstruction. The concomitant circumstances and symptoms would sufficiently distinguish such a case from one of ascites.

Treatment.—You may gather from the details already given in the history of the cases much respecting the proper course to be pursued in their treatment. If you can clearly make out that the ascites depends on disease of the liver and of its capsule, and if the liver be not permanently contracted, then the treatment should be directed to the reduction of the chronic inflammation which affects the capsule. With this view, if nothing in the habit of the patient forbids it, the use of mercury may be resorted to, and in many instances it will prove highly useful, and a free discharge of water by the kidneys will often take place simultaneously with the production of ptyalism.

It is also desirable to increase the action of the

kidneys by other means besides. In the cases which I have detailed to you, we used as diuretics, with variable degrees of success, broom, taraxacum, cantharides, nitre, bitartrate of potass, lemon-juice, digitalis, squills; and these are among the best of a very uncertain class of remedies. To them I may add a very useful diuretic, which may be prescribed in doses of from five to fifteen grains, dissolved in water; namely, the benzoate of ammonia.

I also recommend your attention to a part of the treatment which I usually pursue with great advantage, viz., *pressure* on the abdomen by means of bandages and strapping. Two of the cases derived great benefit from it, especially the man to whom I have already alluded; he expressed himself (and the feelings of the patient are in such a case very valuable) as much relieved by it.

A question often arises as to the propriety of *tapping* in cases of ascites. My opinion is, that the operation of tapping should be delayed as long as possible, to give full opportunity for the use of internal remedies; but that it should not be postponed until the distension is extreme. When the distension is allowed to become excessive, the danger from tapping is much increased; a state of collapse and of low peritonitis are, under these circumstances, more apt to ensue; therefore, if you have tried all reasonable measures, and they have failed, do not wait for extreme distension, but

tap at once. This danger may be much diminished by careful treatment before and after the operation. The first point is to take care and have the bowels well emptied by mild means a day or two before the operation, such as by a full dose of castor oil, and by enema, or by both. Then, on the night preceding the tapping, give a dose of opium; repeat this just before the operation, and also an hour or two after it, and adopt measures to keep your patient moderately under opiate influence for two or three days until the great danger of peritonitis has passed by. After the operation do not meddle with the bowels; it is not desirable that they should be moved by artificial means for some days at least. Exciting the peristaltic action of the bowels has a tendency to bring on peritonitis, or to prevent its termination by resolution or adhesion, if it has already supervened. Hence your rule should be, not to interfere, even although some days (even seven or eight) may have elapsed without an evacuation from the bowels; and then, when it may seem important to bring about their action, this should be done by means of an enema.

Still, tapping can be regarded generally only as a palliative measure, and affords very little hope of ultimate cure; nevertheless, it must not be regarded as hopeless, for some cases get quite well under it, and the dropsy never returns. An instance of this you may have often seen in a woman who frequently comes to the hospital for

other complaints. She was tapped twice, and in her case I followed the practice which I am now recommending to you; but without success. I then tapped her a third time, after which she quickly recovered; and she has remained well ever since—now a period of five years. Another case was that of a man who was tapped for ascites, apparently dependent on hepatic disease; he got quite well, and several years afterwards came into the hospital for another malady, but without any recurrence of the dropsy.

Both these cases exhibited, to a remarkable extent, a sign to which I have already alluded as not unfrequently present in peritoneal dropsy—namely, a dilated and tortuous condition of the superficial epigastric veins. This venous enlargement is probably compensatory, and serves to open up a new and enlarged channel for the blood which cannot be returned through the hepatic circulation. Hence I am disposed to regard great enlargement of these veins as a favourable sign; and I should be more inclined to tap where that enlargement exists than where the veins remained small.

Tapping may be performed with better prospect of success when the liver is enlarged than when it is contracted; and it affords least prospect of benefit when the obstructing cause to the venous circulation is extrinsic to the liver, as when it consists of a tumour, or of chronic peritoneal disease.

Upon the whole, the conclusion at which I have arrived is, that tapping, though a remedy not lightly to be adopted, is one not lightly to be rejected; and although in the majority of cases it does not result in an ultimate cure, yet it is not to be regarded as affording no hope, but, indeed, often tends to prolong life.

LECTURE XI.

On Ascites.

Gentlemen,—As there is now in the hospital (March, 1853), a case of great interest for the purpose of clinical analysis in connexion with the subject of dropsy, and especially of abdominal dropsy, and as the patient has within the last few days been subjected to the operation of tapping, of the issue of which we are as yet uncertain, I will avail myself of this opportunity of calling your attention to the principal points of her case, and making some observations on ascites.

Case XXXIV.—The patient is named Eliza Richardson, and was admitted into the hospital on January 12th (vol. xxxviii. p. 154). The first point to be noticed respecting her is her age, which is only twenty-four years. Dropsy is not common at this early period of life. At just the age which this patient has attained dropsy is less frequently met with than during childhood, for then it often occurs in connexion with that state of kidneys which follows or accompanies scarlet fever. At this patient's age it occurs most

commonly as an effect of cardiac disease, which generally dates from an attack of rheumatic carditis on a previous, and, perhaps, a remote occasion. In the earlier periods of life, dropsy consequent on disease of the liver or spleen is seldom met with; and when abdominal dropsy occurs in young subjects, independently of renal disease, it is almost always associated with, and caused by strumous peritonitis and enlarged mesenteric glands.

In the history of our patient, Richardson, we find no evidence of the previous occurrence of scarlet fever. She had followed the sedentary and irregular employment of a brush-drawer. In 1847 a hard swelling formed in her right side, which was attributed to her having carried a heavy pailful of water upstairs; under local treatment this got well in a few days. As to the precise nature of this swelling, it is, of course, impossible to form anything like an accurate opinion at this distant period of time. With this exception, she never had any particular illness, nor had she ever suffered from rheumatic fever. About five months prior to her entrance into the hospital she married, and since that time the catamenia have not appeared regularly. Three months before her admission she noticed that her ankles were swollen; this œdematous state, however, got better, until seven weeks before her admission, when the swelling increased, and extended up her legs and thighs to her belly.

There was no swelling of the hands or face, except a little puffiness of the right eyelid about three weeks after this. The urine was scanty and high coloured. When brought into the hospital, her abdomen was greatly distended and very tense, more so, indeed, than I ever remember to have witnessed before; there was dulness on percussion almost universally over the belly; the lower limbs were highly anasarcous, but neither the face nor the upper extremities were swollen; there was no considerable dilatation of the superficial abdominal veins; the breasts were not enlarged, and there were no areolæ, but she had been suffering some time from slight morning sickness; the sounds of the heart were quite normal; her most distressing symptom was difficulty of breathing, which appeared to be due to the upward pressure of the fluid in the peritoneal cavity. It was evident that the swelling of the abdomen depended on the presence of fluid, as fluctuation was very distinct in all directions. The urine had a density of 1023; it was thick from lithates, contained a good deal of albumen, and under the microscope exhibited a few pus-cells, but no casts of tubes at this time. I should here observe, that no certain conclusions can be drawn from the presence of a few pus-cells in the urine, particularly in that of women, as they may have their origin in even a slight leucorrheal discharge.

The case, then, appeared to be, *primâ facie*, one of dropsy of the belly and of anasarca, which had come on in three months—the abdominal dropsy, indeed, in three weeks,—and the question which we had to decide was, "What is the nature of the abdominal dropsy?"

The patient being a female, there were two views as to the cause of the dropsy which would have at once occurred to any one; either the fluid might have been contained in a large unilocular ovarian cyst, filling the belly, or it might have occupied the sac of the peritoneum. In the majority of cases the diagnosis between ovarian and peritoneal dropsy is very simple, because the amount of fluid is, generally speaking, not great; but when the effusion is considerable, the diagnosis becomes a matter of extreme difficulty, and it then usually rests upon the *history* of the case.

Let me impress upon you the following points connected with these two forms of dropsy. If the dropsy be *ovarian*, there will very often be a history of a gradual commencement of the swelling in either the right or left side, and thence extending upwards; more or less pain likewise will usually have been complained of in one or other side, according to the primary seat of the swelling. *Ovarian* dropsy occurs most frequently at the advanced periods of life, and is much more common in persons past 30 or 35 years of age than before that age.

We must not look for aid in our diagnosis from the state of the uterine functions, for many women have ovarian dropsy whose catamenia are natural; whilst in many others, perhaps indeed in the greater number, the menstrual discharge is either irregular or insufficient, although not absent. In ovarian dropsy the swelling may be diffused and uniform, and distinct fluctuation may be got at all points of the abdomen, in this respect exactly resembling ascites; and when these signs exist, the fluid will generally be found to be contained in a single cyst, which is for that reason called *unilocular*. In such a case there will be dulness on percussion over the whole belly—its centre and sides, in all positions of the body; but, unless the accumulation of fluid be excessive, *deep percussion* will elicit an intestinal sound over each loin from the presence of the colon.

If, on the other hand, the case be one of *ascites*, the best test, when the amount of fluid is not excessive, is that derived from percussion. The percussion-sound over the lateral regions of the belly is dull, while over the centre it is clear, in consequence of the intestines being there buoyed up by the fluid, so that they come into contact with the abdominal wall. Moreover, if the patient be made to turn over upon the left side, the fluid will gravitate to this side, and, consequently, the sound elicited by percussion will be dull, perhaps as high as the umbilicus, while

higher up it will be clear; and *vice versâ*, when the patient is turned upon the right side.

In ovarian dropsy it often happens that there is no satisfactory history of the commencement of the swelling, the patient not having been aware of its existence until the abdomen had attained so large a size as to attract the attention of her friends, or until she had noticed that her dresses seemed much too small for her. And in ascites, if the amount of the effusion be very considerable, the facility of diagnosis is greatly diminished. In such a case, the clear sound on percussion over the umbilicus is lost. The abdomen becomes so enlarged by the vast accumulation of fluid in the peritoneal sac, that the mesentery will not allow the intestine to come into contact with the abdominal wall. Or, as Dr. Watson observed, when the intestine is tied down to the spine by old adhesions, or by peritoneal disease, a similar result follows, even although the dropsy be inconsiderable. In such cases percussion is dull everywhere over the belly, and a main source of distinction being thus lost, we must trust much to the general history: and thus it was in our patient upstairs. Some aid in diagnosis is gained from an examination *per vaginam*, which will sometimes detect a solid mass, or detect the encysted character of the dropsy, if the disease be ovarian.

Here, then, was a young woman, twenty-four years of age, with this great amount of dropsy;

she had no uterine disturbance, except that her catamenia had lately disappeared, and her having been recently married seemed to offer a reasonable explanation of their stoppage. She was a little too young for ovarian dropsy; but age by no means affords an absolute rule; for many cases are recorded at the age of this person, and I shall presently call your attention to the case of a girl in this hospital,* only fifteen years of age, with ovarian dropsy, who was tapped twice. The enlargement of the belly in Richardson came on in three weeks. This rate of accession seems to be too rapid for ovarian dropsy, for in this affection the swelling generally manifests itself much more slowly. Then, there was other dropsy combined with that of the belly, there was considerable anasarca of the lower extremities, and this had preceded the abdominal accumulation; this also was inconsistent with the diagnosis of ovarian dropsy. Ovarian dropsy is an isolated dropsy; and, where it is combined with any other forms of dropsies, these *follow* it, as where anasarca of the lower extremities results from a large ovarian tumour, which exerts so much pressure upon the ascending vena cava that a dropsical effusion takes place into the areolar tissue of the legs

* Case XXXV. Mary Jane Manuel, æt. 15 (vol. xlii. p. 252).

and thighs. Ascites, also, occurs occasionally in association with ovarian dropsy, in consequence of the pressure which the latter exerts upon the abdominal veins, combined, perhaps, with some degree of hepatic disturbance. In consequence of the anasarcous state of the pudenda, an examination of our patient *per vaginam* was not instituted.

Upon these grounds, then, we concluded that the case was one of ascites, with anasarca.

Now ascites in most instances is due to retarded circulation through the liver; it also often depends upon chronic peritonitis, tubercular peritonitis, or the presence of a large tumour of any kind in the belly, such as a tumour of the mesentery, or an enlargement of the spleen. There was no unequivocal evidence of disease of any of the abdominal organs in this case, nor were there any indications of peritonitis, although the patient had suffered a little from sickness, but no more than commonly occurs in the early months of pregnancy; and she had had no pain in the belly. There was no distinct evidence of the existence of a diseased condition of the liver, and it did not appear that our patient had been addicted to intemperate habits, or had led a debauched life. Her age was almost too early for any form of diseased liver, except the scrofulous.

She had never been jaundiced, and there was no appearance of bile in the urine. The superficial abdominal veins, it is true, were enlarged,

and they have been getting larger ever since her admission into the hospital—a condition which is of frequent occurrence when the liver is becoming contracted, and the circulation through this organ impeded. There were lithates in the urine, but not in great abundance; and there were no purpurates, as often happens in cases of chronic liver disease.

Diseases of the kidney, as you are aware, are a very fertile source of dropsy; but this dropsy is anasarca, though in the advanced stages effusions frequently take place into the serous cavities; but when, with disease of the kidney, there is also a morbid condition of the liver, even although slight, fluid will often accumulate in the peritoneal cavity to a considerable extent. Oxalate of lime, lithates, and epithelial cells, were observed in the urine of this patient from time to time; and although there is not very satisfactory evidence, still I am inclined to believe that there is chronic disease of the kidneys, which, however, will not explain all the phenomena; and there can be but little doubt that there is, also, some derangement of the hepatic circulation from an impediment to the flow of portal blood through the liver. The real nature of the case, then, is that the dropsy is primarily dependent on a chronic renal affection, and that it has been largely determined to the peritoneum in consequence of a greater or less amount of hepatic disease. As the

case progresses we shall, no doubt, get further insight into its nature.

The treatment to which this patient was at first subjected was adopted on the supposition that the dropsy was mainly attributable to the condition of the kidney; it consisted in hot-air baths, compound jalap powder, and bitartrate of potash. The compound jalap powder purged her freely, but she could not bear the hot-air baths; and as she seemed to derive but slight benefit from their employment, and, on the contrary, increased in size, and passed only two-and-a-half pints of urine daily (24 hours), I changed the treatment to the exhibition of a quarter of a grain of elaterium every morning. This operated violently, griping her very much, and producing copious watery evacuations, without increasing the quantity of urine, or materially diminishing the size of the belly, and it induced a considerable amount of sickness. This last symptom you will find in practice to be the great drawback to the use of elaterium—namely, that it acts not merely as a *drastic cathartic,* but likewise as an *emetic.*

Finding under these circumstances that there was no indication of a diminution of the dropsy, and that medicines appeared to exercise no influence upon the kidneys, I felt it important that some decided step should be taken to relieve the tension of the lower extremities and belly; for

it often happens in these cases that, when the tension is relieved, the kidneys begin to act, and that diuretics then produce their usual effects. Accordingly, I adopted the plan of making a single incision about an inch and three quarters in length just above the inner ankle of the left leg, and a considerable quantity of fluid drained away from this opening—more than two pints in the course of a few hours. This was done on the 26th. On the 27th the patient was much relieved, and a large amount of fluid was still draining away. On the 28th I considered it important to make a similar incision in the other leg, and she was then ordered a diuretic draught containing digitalis thrice a day. The kidneys now began to act more freely, she passed from two to three pints of urine daily, and a good deal of fluid drained away from the incisions in the legs. In two or three weeks the legs became much reduced in size, still, however, remaining much swollen. The abdomen, also, continued of very great size. Under these circumstances, tapping was the only remaining resource, and it was rendered the more imperative by the fact that her breathing was becoming difficult and distressed. The operation was performed three days ago (March 12th) by the house-surgeon, Mr. George Lawson, and in this way there was drawn off a large quantity of a serous fluid, of a citron colour, slightly opalescent, of specific

gravity 1012, and containing a large amount of albumen.

Now to have recourse to tapping, or indeed to any surgical operation, is not very creditable practice; for one ought to be able to effect the carrying off of the water by inducing the kidneys to act freely without resorting to this step. Still, I believe, we may leave these cases too long before calling in surgical assistance, and thus the opportunity may be lost of obtaining that relief to the whole system which the getting rid of the fluid almost always affords.

I should have stated that we also used in this case the benzoate of ammonia, and for a short time it appeared to answer very satisfactorily; and that we likewise tried the combination of squill, calomel, and digitalis, but without any material benefit. Finding, then, that the dropsy did not diminish, we considered ourselves justified in hoping that, after the removal of the dropsical fluid, the kidneys would become more active.

The operation of tapping is by no means always successful; not uncommonly it proves fatal by inducing peritonitis; but I cannot help thinking that it is fatal in this way oftener than it ought to be, in consequence of the neglect of certain precautions which should always be carefully attended to. The precautions to which I allude are these, that the patient should be kept well under the influence of opium from the commence-

ment of the operation, or even for a short time before it; indeed, in any operation upon the peritoneum, this point should be kept well in view. One cause of the peritonitis which is so apt to follow this operation is the increased peristaltic action of the intestines, often excited by air entering the wound, and by the altered condition of the peritoneum. You should take care not to be too anxious for the bowels to act once in three or four days, or even longer. Your best guide as to the question of relief to the bowels will be the feelings of the patient. If he feels pretty comfortable and experiences no uneasiness from the bowels not acting, you need not interfere; and unless he suffer great inconvenience, you should still adopt the non-interference policy. It is your duty to wait until all inflammation has subsided, for five or six days or even more, before you take any steps for opening the bowels. Immediately after the operation has been performed, a grain, or a grain and a half of opium should be given, and the dose should be repeated every three or four hours, according to circumstances; or the dose may be larger than this, if there be reason to suppose that symptoms of inflammation are about to come on. Not unfrequently this operation is successful in prolonging life, if not in curing the disease, and it is from a knowledge of this fact, that I had recourse to it; on similar grounds

I would recommend you not to postpone it too long, inasmuch as the greater the tension and overstretching of the abdomen, the more apt is reaction to ensue when relief is afforded, and the longer the delay, the weaker will be the patient's condition, and the less power will he have to resist inflammation or to withstand exhaustion.

Last year we had in this hospital a case not unlike that which we have now been considering; it afforded a good instance of the successful issue of the treatment adopted in the case of Richardson. The patient remained in the hospital for nearly two months after she had been tapped, without the slightest indication of any return of the dropsy being observed during that time. She left on the 9th of October, 1852. One of the students here told me, a few days ago, that he had recently met her in the street (five months after the tapping), and that she informed him she had never been better in her life, and had remained quite well ever since she left the hospital.* The success of this case encouraged us to hope that the operation would at least succeed in prolonging Richardson's life, and that it was quite justifiable.

It will be instructive to place in juxtaposition with this case of Richardson one of ovarian

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* The details of this case will be found in the preceding Lecture, Case XXXIII., p. 269.

dropsy, and I shall select, as a good example of the unilocular cyst, the case to which I have already alluded as having occurred at the unusually early age of fifteen.

Case XXXV.—Mary J. Manuel, æt. 15, admitted Nov. 1854, with an enormous swelling of the abdomen (vol. xlii. p. 252). A not unhealthy looking girl, very nervous and reluctant to be examined, never had robust health, but has lived comfortably at home, and has had plenty of nourishment. There were no indications of that strumous aspect which so often accompanies abdominal enlargements in young persons.

We learned from the girl that she first noticed the swelling thirteen months before her admission; she described it as having been always uniform, not having commenced at one side more than the other. It made but slow progress at first, but increased so rapidly within the last two or three months, as to have doubled in size. Before the swelling came on, she suffered much from sickness and vomiting, and pain after eating. Latterly she has lost flesh a good deal, but her state of emaciation is not greater, nor scarcely so great, as might be expected with so much abdominal enlargement.

Menstruation commenced in this girl two or three months before her admission, and has been repeated two or three times since, but never in great quantity. This, it will be observed, was

ten months after the commencement of the swelling.

After standing or sitting for some time with the legs down, an anasarcous condition of the feet and ankles would come on, which would subside on lying down.

The urine was acid, specific gravity 1016, no albumen; bowels regular; digestive functions natural.

The following description of the abdomen was noted soon after her admission by my clinical clerk, Mr. T. P. Teale.

Her belly is now of immense size, projecting very much in the antero-posterior direction, more so than laterally, and bulging out at the lower end of the sternum. The shape is not perceptibly altered by change of position, and there is not any marked bulging at the loins when she lies on her back. The swelling is nearly symmetrical: there is some bulging just above the pubes to the left of the median line, which is due to an œdematous state of the integuments there, kept up by her lying chiefly on her left side. Fluctuation is very distinct all over the abdomen. There is an absolute dulness on percussion over the whole of the belly, except for a small space in the loins, in the course of the ascending and descending colon. There is no evidence of any increase of resonance at these parts when she lies on either side, as if intestine floated to the surface.

The *primâ facie* diagnosis, in a girl at so early an age as this patient, was peritoneal dropsy. Her aspect, and the absence of all hepatic symptoms, forbad the supposition that the dropsy could arise from obstructed portal circulation in the liver. Was it due to tubercular disease of the peritoneum, or of the mesenteric glands? This view was negatived by the duration of the abdominal enlargement throughout a period of thirteen months, in which space of time tubercular disease would have terminated fatally, or have induced such a degree of emaciation as would have rendered the nature of the case unmistakeable. The great size and the duration of the swelling, the perfect fluctuation, and the supervention of menstruation excluded pregnancy. We had, therefore, no other conclusion to adopt than that the disease was a large unilocular ovarian cyst, and in this view we had the advantage of Dr. Arthur Farre's concurrence, who, on making an examination *per vaginam*, distinctly felt a cyst containing fluid. The downward pressure of the cyst had produced prolapsus uteri of some months' duration.

The diagnosis of this case was confirmed by the subsequent history. After a fortnight's sojourn in the hospital, during which various drugs were ineffectually tried, the abdomen acquired such a size as to impede the free action of the diaphragm. It therefore became a matter of

necessity to tap. This was done by Mr. Fergusson, and fifteen quarts of a viscid clear fluid, of the colour of very pale urine, were drawn off. It was of the consistence of uncoagulated white of egg, specific gravity 1007, and slightly alkaline, and contained a large quantity of albumen. After the fluid had been all discharged, no indication of any other cyst could be discovered, and the abdomen became tympanitic, there remaining immediately around the umbilicus, to a certain degree, a less clearness of sound, as if some dense structure intervened between the bowels and the abdominal wall.

The nature of the fluid evacuated in this case points strongly to ovarian disease. In ascites the fluid is either a clear straw-coloured, or whey-coloured serum, or a bloody serum, and never, so far as I know, is viscid, save in some cases of chronic peritoneal disease of a malignant kind and of comparatively rare occurrence.*

It is worth bearing in mind with reference to

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* The subject of this case remained in the hospital from early in November, 1854, until the 19th of January, 1855. She then left, the fluid having begun to re-accumulate, but only to a slight extent. In December, 1855, she returned to the hospital, the cyst having become as full as before. She was again tapped, and left the hospital in January, 1856. In June of the same year she was re-admitted the third time, her abdomen having attained about half the size it was when she was tapped the second time.

the diagnosis both of ovarian dropsy and of ascites, that cysts sometimes form beneath the liver or in some other part of the peritoneum. Careful percussion, under varied positions of the patient, ought to enable you to recognise such structures in the living body.

A week after the operation in the case of the woman, Richardson, (which forms the text of the lecture), vomiting and other signs of peritonitis manifested themselves, and the patient gradually sank and died on the eleventh day after the operation, and the eighth day after the delivery of this lecture.

The condition of the body, which was examined thirty-six hours after death, was as follows :—

The body generally was somewhat emaciated, the lower extremities highly anasarcous, and the abdomen enlarged. The wounds upon the legs, which had been made some time before for the purpose of relieving the tension of these parts and draining off water, looked healthy and granulating, and one was partially cicatrized. The wound in the abdominal wall had, also, a healthy appearance. The peritoneal cavity contained a large quantity of a serous fluid, with some flakes of recent lymph floating in it, and also cobweb-like pieces of apparently recently effused fibrine extended from intestine to intestine, and likewise from the viscera to the abdominal walls. The lungs were

healthy. The heart was rather small; its valves were quite healthy, as were also the great blood-vessels. The spleen was large and rotten, and had some rather large hæmorrhagic patches in its substance. The uterus was unimpregnated.

The liver was somewhat enlarged, and had the appearance of an early stage of cirrhosis; Glisson's capsule was thickened, and the organ contained many of those tumours which have been described by Dr. Budd under the name of "*Encysted knotty tumours of the liver.*" The kidneys were almost twice their usual size and weight, and were much congested. One kidney, with a portion of the liver and spleen, were placed in a jar of water, and sent to Dr. Johnson for examination, on March 28th (five days after death), whose report of them is as follows:—"The kidney weighed eight ounces; its surface was smooth and red, but the lobular markings were indistinct. (The red colour probably resulted from the kidney having become stained by the bloody fluid in which it was immersed.) The colour of the whole organ was such as might have been produced by soaking it in bloody water, and the cortical and medullary substances were nearly of the same hue. The arteries were decidedly hypertrophied, and the Malpighian capillaries thickened; in the canal of one artery a collection of oil-globules was distinctly seen. There was *no* healthy epithelium in the tubes; it

seemed as if the epithelium was easily detached, so as to leave the basement membrane, which appeared somewhat thickened, and the organ afforded excellent specimens of *matrix*. There were no actually denuded tubes, nor yet was there a distinct non-desquamative condition (*i. e.* the epithelium sticking to the tubes, so as to leave a free canal in the centre). In many of the tubes there was an opaque, granular condition of the epithelium, so as to leave no cellular space.

"The liver was in an early stage of cirrhosis, just beginning to be granular; besides this, there were several firm, white, circumscribed tumours, ranging in size from that of a pea to that of a small orange, some on the surface, but most collected near the entrance of the portal vein, where a large portion of the liver was of an almost cartilaginous hardness. The liver-cells were remarkably opaque and granular; but though opaque, of a lightish colour (not yellow), with scarcely a particle of oil in them, and the nuclei concealed in great measure by the granular contents of the cells. The tumours seen by the microscope presented a finely-granular appearance, with only here and there a trace of fibres in the midst of the granular matter, probably atrophied remains of the normal tissues. There were no crystals in the tumours."

The increase of size of the kidneys in this case was no doubt in part due to their excessive

congestion, and it is not improbable that this was kept up first by the great weight of water pressing on them, and afterwards by the peritoneal inflammation which followed the operation of tapping. It was, nevertheless, sufficiently plain that both liver and kidneys were the seat of an analogous morbid process, tending to some more definite form of disease, such as the waxy enlargement—or even, after the congestion had subsided, to the chronic contraction.* That these are states of perverted nutrition, rather than of inflammation, I can entertain no doubt; at the same time, it seems to me quite possible, and, indeed, it may not improbably be even of frequent occurrence, that an inflammation may supervene upon either of these states, and may develop dropsy and other complications more quickly, and even bring on the fatal result. We must not shut our eyes to the fact that we have not yet found the correct interpretation of all the morbid changes which have been recorded in this and similar cases, and that much careful and patient observation is still needed before we fully understand the true nature of the diseased action.

The diagnosis was correct so far as it attributed the dropsy to a morbid state of both kidneys and liver; but I think it ought to have done more; it ought to have made a nearer approach to a

* See Lects. III. & IV.

more exact indication of the precise condition of both those organs. More frequent and more careful examination of the urine and of its deposits might have enabled us to speak more definitely as regards the kidneys, and from their condition we might have inferred that of the liver. The practical result, however, would have been the same; for had we known during life what the *post-mortem* inspection revealed to us, we should have been equally led to the same course, with perhaps less hope of immediate or ultimate success.

I have the opportunity of adding yet one more case to complete this lecture. It is a good illustration of how much may be done to prolong life by tapping in ascites (especially when the liver is large), observing the precautions as to treatment to which I have already alluded.

The case occurred in the practice of my friend Mr. Lavies, with whom I frequently visited the patient, and to whom I am indebted for the notes of it. The patient was also seen by some other physicians.

Case XXXVI.—Mr. E., æt. 70, was generally healthy, with the exception of occasional attacks of bronchitis. In October, 1853, he had a slight paralytic attack which affected his face and speech only, but passed off within an hour.

In March, 1854, some œdema of the legs was

observed for the first time, which remained for a week, when the bowels became relaxed and black pitchy dejections were passed; this condition of the bowels continued for four or five days, accompanied by much prostration. On examining him on the 24th, in company with Mr. Lavies, it was found that the liver was much enlarged, and felt somewhat indurated, but smooth and free from any tuberculated or knotty character of its surface.

Under mercurials and diuretics the œdematous state disappeared about the 20th of May, and he continued free from dropsical symptoms till the middle of June, when the œdema reappeared, and now a slight fluctuation could be felt in the abdomen.

Under the prolonged use of squill and digitalis, with the tincture of the sesquichloride of iron, the œdema disappeared again in September, the abdominal dropsy remaining. The patient now left town for several months.

From January till October, 1855, the dropsical symptoms gradually increased, and the abdomen became very much distended. It was now judged advisable to perform the operation of paracentesis, as no influence could be exerted on the kidneys through diuretic remedies. The abdomen measured forty-six inches in circumference.

The operation was performed by Mr. Lavies on the 23rd of October, and eighteen pints of

fluid were withdrawn. Immediately before the tapping, and for some days after it, the patient was kept under the influence of opium. He recovered quickly, and was soon able to go about.

The belly gradually refilled, and in February, 1856,—four months after the first tapping,—it was found to measure forty-six inches in circumference. He was tapped a second time on the 22nd of February, and twenty-eight pints of fluid were withdrawn. Under a similar treatment to that adopted at the first operation he recovered very speedily.

Notwithstanding the free use of various diuretics, our patient's abdomen very quickly filled again after the second operation, so that it was found necessary to tap him a *third* time after only two months had elapsed (April 23). On this occasion thirty-three pints of fluid were evacuated. No untoward symptom followed this operation; the same treatment was adopted as on the former occasions, and in a few days he was able to go out.

On the 30th of May, 1856, about a month after the third operation, the patient was dining out; and, shortly after dinner, he was seized with giddiness and slight paralysis of the left side, which lasted only a few hours. No remedial means were adopted, except the exhibition of small doses of the tincture of the sesquichloride of iron and the tincture of squills, and rest in the horizontal posture.

In ten days the patient was well enough to take a drive in his carriage; his general health improved, and the kidneys continued for some time to secrete three pints of urine per diem. Soon after the paralytic attack, he passed some small calculi from the bladder, which were found to consist of cystic-oxide.

In August, 1856, the abdomen began to increase again, and at the same time the legs became much more œdematous than usual, although the belly did not increase in a similar ratio. Mr. Lavies thought it advisable not to defer the tapping, and operated for the *fourth* time on the 28th of October, and drew off thirteen pints of fluid.

I visited the patient about three weeks after this fourth operation, and found him quite free from dropsy, and the liver reduced in size and less indurated. His general health was good, appetite excellent, and he was able to take a fair share of both foot and carriage exercise. A quart of urine was passed daily, quite free from albumen.

In concluding this lecture let me add a few words on the operation of paracentesis itself.

All of you who have witnessed the operation in this hospital will have observed that it is invariably practised while the patient is in the horizontal position. You place him lying on his right side at the edge of the bed, with the abdomen projecting over it as far as is consistent

with safety. A sheet is placed loosely around the belly, and an assistant, who stands at the patient's back, is ready, by drawing the ends of the sheet, to exercise a gradual compression of the abdomen, if required. But this is seldom, if ever, needed; the horizontal posture completely protects the patient from exhaustion or syncope, without the necessity of the complicated, and often embarrassing, process of compression formerly used—a proceeding, by the way, which was not without its dangers as regards peritonitis. The position of the patient is, on the whole, favourable to the escape of fluid from the abdomen, and on this account is also preferable to the sitting posture formerly adopted. My experience of this mode of operating extends to a very great number of cases both of ascites and ovarian dropsy, and I have never seen any disadvantage attending it. I have, therefore, no hesitation in advising it as the best course of proceeding; it is that which I know Mr. Fergusson follows, and it is now some fifteen years since we adopted this practice in an important case in private practice in Albemarle-street. I am informed that it is also the plan of operating which is now practised by my distinguished friend, Dr. Simpson, of Edinburgh.

LECTURE XII.

*On the Gouty Kidney.**

GENTLEMEN,—The case on which I propose to comment to-day is singularly illustrative of the pathology of gout, and exhibits many points of extreme practical interest, highly deserving of the attention of those who study the practice of medicine with a proper desire to ascertain the real nature of the various morbid processes which are ever coming under observation.

A knowledge of the real nature of Gout, and of its kindred malady, Rheumatism, is, in my opinion, at the very foundation of all sound pathology. I am therefore glad to have an opportunity of calling your attention to a case, in which the seeds of disease have been sown most extensively, and have taken deep root in nearly every situation. The record of the case has been faithfully and carefully kept by my clinical clerk, Mr. (now Dr.) Tanner:—

CASE XXXVII.—Eliza Rapley, æt. 40, admitted June 5, 1846 (vol. xvii. p. 91): married, and has had

* This lecture was delivered in June, 1846, and printed in *The Medical Gazette* of June 18, 1847.

two children, the last being now fifteen years of age. Latterly she had led a very irregular and intemperate life, and had been a prostitute. She stated that she never enjoyed good health, and had especially suffered from repeated attacks of rheumatic gout, affecting all her joints, large and small. These were, no doubt, increased in frequency and severity by her habits of intemperance.

Three months before admission she had her last attack of rheumatic gout. Shortly after this she observed her legs beginning to swell, as well as her abdomen. The swellings having increased considerably, she sought and obtained admission into the hospital.

Her appearance was strikingly indicative of that extreme disturbance of the general health and constitution which is always produced by the long continuance of gout in the system. There was an unhealthy sallow hue, with an anxious expression of countenance. Her eyelids were swollen, as also her cheeks: the facial dropsy, although sufficiently distinct, was not excessive. Her feet and legs were also œdematous, and pitted distinctly on pressure.

There was considerable swelling of both knee-joints, caused evidently by an effusion of fluid which distended their capsules. The patient complained very much of pain in both these joints, especially the right, which was the most swollen.

Most of the small joints, particularly those of the fingers and toes, were swollen from old attacks of gout, the swelling apparently being due to a thickening of the fibrous tissue;—some of them grated on moving the surfaces upon each other, indicating the absorption of their cartilages, and the probable deposition of lithate of soda in their place.

You will remember that I stated more than once, at the patient's bedside, that I thought it very likely that a similar change—namely, absorption of the articular cartilages and deposition of lithate of soda, had taken place in the knee-joints; and that the articular surfaces of the femur, tibia, and patella on each side would be found thus affected.

The abdomen was not enlarged, nor dropsical. There was no evidence of enlargement of the liver. On the contrary, everything favoured the opinion that this organ was in some degree contracted; the intemperate habits of the patient, the sallow hue of her skin, a slight dilatation of the abdominal veins, and the absence of dulness on percussion over the right hypochondriac region, served to excite suspicion as to the existence of a degree of cirrhosis of the liver, and justified our expecting abdominal dropsy if it proceeded further.

The heart was likewise evidently affected. We had proof of this in the augmented impulse of the organ, and the increase of dulness in the

cardiac region: and on placing the stethoscope over the heart's apex, a loud bellows-sound was heard synchronous with the systole of the ventricle. To the right of the heart's apex, and along the aorta, this sound became less distinct, and vanished altogether as the stethoscope was passed up the aorta. It was, however, very audible beneath the angle of the left scapula. The pulse was small and weak, and its frequency 100. These signs indicated some hypertrophy and dilatation of the left ventricle, with imperfection of the mitral valves.

The urine was not materially altered in quantity, being sometimes below, sometimes above the normal amount: its specific gravity was 1012: it was clear and pale. By heat and nitric acid it yielded a slight precipitate of albumen.

What is the state of kidney which produces this condition of urine? Some would answer, an advanced stage of Bright's disease.* Such, however, is not the case, in my opinion. I do not believe that the woman ever had Bright's disease. The history of the case does not conform to the ordinary course of things in that disease. Her aspect is quite different from that in Bright's disease; the dropsy is not so general nor so much; there has been no great frequency of micturition.

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* The term, Bright's disease, is here used to signify the large, mottled, and *fatty* kidney.

On the other hand, her extreme gouty state of constitution led me to think that she had a contracted and shrivelled state of kidney, in which a large portion of the organ is wasted and its structure condensed—a condition which, while it may also occur in other states of system, is peculiarly apt to be developed in the inveterate gouty diathesis.

The first case of this kind which arrested my attention (although I did not perfectly understand its nature at that time), occurred to me five years ago. The patient had been a gentleman's butler, and had had several attacks of gout. He had a sallow, unhealthy look; and the only appearance of dropsy about him on his admission, was a copious effusion into one knee-joint. His urine was sufficiently copious, quite clear and pale, and contained a small quantity of albumen. This patient died suddenly, and we found a copious effusion of fluid in one pleura, which must have taken place a few hours before death: and both kidneys were much contracted, shrunk, and granulated upon their surface, presenting all the characters of what has been described as the third stage of Bright's disease.

Not many weeks ago we had a man in Sutherland ward, whom most of you may remember, the subject of chronic gout affecting the knees and ankles, and the plantar fascia. This man had the same sallow unhealthy look which this woman presented. His urine was slightly albuminous,

but copious, pale, and of low specific gravity. There was no dropsy in this case. I have no doubt that the same state of kidney existed here as in the case which we are now considering. The patient got better, and left the hospital.

In reviewing the case of Rapley, it would appear that she has been the subject of chronic gout, and that her joints, large and small, have all been more or less damaged by the disease; that her heart is affected, her liver probably contracted, and her kidneys likewise. How strikingly do these consequences of the long continuance of the malady comport with the humoral view of the pathology of this disease! Not only are those parts which the morbid matter of gout is most prone to affect materially damaged, but likewise the emunctories through which the poison would make its escape out of the system—the liver and kidneys: these organs have become poisoned by the morbid matters which have escaped, or tried to make their escape from the system through them; and therefore it is natural to expect a considerable change in their nutrition.

The treatment adopted in Eliza Rapley's case, immediately after her admission, consisted in the application of a blister to the right knee, which was most swollen, mild purgatives, and a bitter tonic (inf. quassiæ) with ammonia.

On the 19th of June it was reported that she had improved considerably; the swelling had been

much reduced, the urine was natural in quantity, slightly acid, specific gravity 1010, without sediment, and it contained a small quantity of albumen.

On the 20th of June there was a sudden decrease in the quantity of the urine, and on that day she was seized with a fit of epileptic character, inducing loss of consciousness and convulsions: the fit lasted some minutes, and on coming out of it she continued in a stupid drowsy state for some time. The small quantity of urine passed was not kept for examination. A mustard poultice was applied to the back of her neck, and this was succeeded by a blister.

On the 21st, at 2 o'clock in the afternoon, she had another fit, more severe than the last. In it she was much convulsed, and bit her tongue severely. The fit lasted a quarter of an hour, during which time she was so unconscious that on her recovery she was not aware that she had had a fit. Her water and motions were passed involuntarily.

On the 22d it was reported that she had had two severe fits since the preceding day. She complained of occasional severe lancinating pains in the abdomen. There was some dyspnœa. Respirations 20; pulse 112. She has been very delirious. Micturition very defective. On the following day she died.

This is a common mode of termination for those diseases of the kidneys which either by

encroaching on the proper structure of these organs, or by any other means, materially diminish their secreting power; and the most probable explanation of this phenomenon is furnished by the fact, that as the proper constituents of the urine are not duly eliminated, they accumulate in the blood, and disturb the brain, giving rise to epilepsy, delirium, and coma.

The *post-mortem* examination presented many points of extreme interest.

The heart was somewhat increased in size, from slight hypertrophy and dilatation of both ventricles. This morbid state of it was due to the imperfection of the mitral valve caused by deposits upon its margin, which prevented the perfect closure of the orifice. It was the regurgitation through this orifice, which remained open during systole, that occasioned the bellows-murmur heard with the first sound of the heart.

The liver was hardened and condensed in structure, and somewhat reduced in size. Its secreting lobules were not materially altered, but the capsule of Glisson, on the external surface of the gland, as well as the prolongation of it into the larger portal canals, was much denser and thicker than natural. This tissue seemed to have been the seat of a morbid process, which probably was produced partly by the intemperate habits of the patient, but partly likewise by the share

which the liver had in the elimination of the morbid poison of gout.

The most interesting morbid changes, however, were found in the kidneys and in the joints.

The kidneys were very much contracted in size; they retained hardly, indeed, so much as one-third of their natural dimensions. They had upon their surface a shrivelled granular appearance. The capsule appeared denser and whiter than natural, and separated with great facility from the surface of the gland. On cutting into the kidney it appeared that the decrease in its size was at the expense chiefly of the cortical substance, two-thirds of which must have disappeared. The cut surface presented much the same granular appearance as the external surface of the gland.

Upon examining portions of these kidneys under the microscope, I found several tubes much dilated, and furnished very scantily with epithelium; others were completely empty; and others, again, collapsed and folded into fine plaits, which gave them the appearance of fascicles of fibrous tissue. A transverse section served to display very well the dilated tubes, showing likewise how small was the quantity of contained epithelium, and how little interlobular tissue there was likewise. Here and there a tube contained at one point, at the bend of a convolution, a few epithelial cells filled with fat; these were, however, few in number, and in many parts the tubes appeared

healthy. Those in the pyramids were for the most part healthy.

These appearances are distinctly indicative of a wasting or atrophy of the gland. Many of the bloodvessels are obliterated; the portions of the gland which these supply waste; the epithelium in them is formed scantily, or not at all; the tubes collapse, and are folded into plaits, giving the appearance of newly-developed fibrous tissue.

Dr. Johnson has shown that the minute arteries undergo a peculiar change in this condition of the kidney, whether it be associated with gout or not. They become much thickened, and their fibrous coats, both the transverse and the longitudinal, acquire a great increase of size. It is in this state of kidney that we often find the cysts which have long attracted the attention of anatomists, which were described by Baillie, and which were at one time supposed to be hydatids. They often occur in great numbers, and of all sizes; sometimes there is but a solitary cyst.

Such a condition of kidney as that which I have now described, one may readily conceive, may be easily produced by a tainted nutrition: the blood charged with the morbid matter or poison of gout furnishes to the glands an unhealthy pabulum, which, while it undergoes changes analogous to those which occur in healthy nutrition, experiences these changes in a very imperfect way,

and insufficient to develop the healthy tissue of the gland. The contraction and shrinking of the kidney is sufficiently explained by this hypothesis. When much of the vascular system of the gland has been obliterated, partial congestions take place as a necessary consequence. Some of the Malpighian bodies would contain too much blood, while others would be imperfectly supplied with it. From those which are too full, effusion of serum would take place into the uriniferous tubes, furnishing the small amount of albumen which is found in the urine. Lastly, the small quantity of epithelium which is formed in the gland indicates a very defective elimination of the urea and uric acid, and the other elementary constituents of the urine. Hence the urine in these cases is pale and of low specific gravity, and contains these products in very limited quantity.

To this state of kidney, when associated, as it very frequently is, with a decided gouty diathesis, I would give the name of "the gouty kidney." To what extent the changes which have taken place in it are due to inflammation, or how far simple inflammation, untainted by any morbid matter in the blood, is capable of producing similar alterations, I do not undertake at present to decide. Rayer has recognised the small and contracted kidney as the result of chronic inflammation, and it has been viewed in this country chiefly as the last stage of Bright's disease.

This latter interpretation of it, I now feel convinced, must be erroneous.*

As to the diagnosis of this disease, we may gather the principal points which will assist us, from the history of this and the other case to which I have referred.

The patient is evidently of gouty habit, as evinced by general signs and by his family history, by his habits of living, and by his having had, to a greater or less extent, attacks of gout in his limbs. There is more or less of dropsy, although this is by no means a necessary symptom, neither is the dropsy so general nor so great as in Bright's disease. The quantity of urine is not, in general, diminished, but, on the contrary, is either normal or increased; and it is pale, of low specific gravity, and deficient in the organic principles, whilst it contains albumen *in small quantity*. The sedimentary matters found in the urine are not, comparatively, in large quantity. Lithates are among the rarest in occurrence; indeed, when the disease is fairly established, I should say that lithates or free uric acid are not found in the sediment. Granular casts of uriniferous tubes, waxy casts of the same generally of large size, altered epithelium, now and then fatty epithelium, and cells which are those of

* See Lects. III. and IV. *On those Conditions of the Kidney with which are associated Albuminous Urine and Dropsy.*

pus or allied thereto—these are the ingredients of that whitish, mucoid deposit which you will always find to collect at the bottom, when the urine secreted by this kind of diseased kidney is allowed to stand in a tall conical glass for a few hours. Now and then, when an acute attack of gout threatens, or has occurred, or bronchial irritation is present, you may have lithate sediments in great abundance; but in the advanced stages blood-corpuscles and pus-cells are apt to occur.

Under these circumstances, the particles of pus, I apprehend, do not come from the kidneys, but from the mucous membrane of the infundibula and pelves of the kidneys, and the ureters, over which the acrid gouty urine flows.

Let me conclude by directing your attention to the state of the joints, which is not unlike that of the kidneys.

During the life of our patient, the knee-joints were distended with synovia; they continued in this state till death. A large quantity of this fluid, presenting its usual viscid character, escaped when the joints were laid open. Litmus paper was strongly reddened by it, proving that it had an acid instead of its normal alkaline re-action. This I have found in several cases of the same kind. Both in gout and in rheumatic fever the synovia of the joints is apt to become acid.

The synovial membrane lining the ligaments of the joints and the synovial fringes were very red,

from an undue degree of vascularity. Here and there it was sprinkled over by a fine white powder, which adhered to it. The articular cartilage had entirely disappeared, and a layer of white matter, like plaster of Paris, had usurped its place: the articular surfaces of both tibia and femur, and even of the patella, were covered with this substance. From the examination of it in similar cases, we presume this to be the well-known lithate of soda, combined with phosphate and carbonate of lime. It was easy to understand from such a state of the articular textures as this, how the bones grated on each other as the joint was moved. It may be observed, that in this case there was no accumulation of lithate of soda within the joint or on its exterior, or in the sheaths of tendons in its vicinity. Both knee-joints exhibited these appearances, but they were much more strongly marked in the left. All the other joints examined were similarly affected, namely, the shoulders, hips, elbows, and even the sterno-clavicular articulations, those of the left side being always worse than those of the right. Some of the phalangeal joints of the fingers and toes had suffered in a similar way.

This curious state of the articulations suggests many reflections upon which I have not time to dilate at present. Let me, however, content myself with remarking how prone the morbid deposit has been to attack the cartilages of the joints, the

nutrition of which it seems to have completely destroyed; how sparingly (comparatively) it touched the synovial membrane which lined the ligamentous surfaces, and how much it kept aloof from the more superficial textures in the vicinity of the joints. In other cases we find it in the sheaths of the tendons and under the integuments, and interfering but slightly with the articular surfaces; and in many instances it both attacks the joints, and accumulates around and outside them, and it is also occasionally seen to be deposited in the external ears, and in the coats of the arteries.

I must here introduce another case very much the counterpart of that of S. Rapley. I quote it in a condensed form from a Lecture on renal epileptic coma, in which it was detailed for the purpose of illustrating the nervous phenomena which follow this derangement of the kidney.*

Case XXXVIII.—M. A. Parry, æt. 44 (vol. xlii. p. 5), a married woman, mother of twelve children; her father died of gout and dropsy.

This woman had a remarkably dirty sallow complexion (very common in cases of chronic renal disease); she had been losing flesh very much for some time, and was in a state of great debility. Ever since her twenty-fourth year, she had been

* *Clinical Lectures on Paralysis, &c.* Lect. XVI., Case lxviii., Second ed. 1856.

subject to attacks of gout. Almost every year she had an attack, which sometimes lasted only a week, sometimes five or six weeks. It affected both the large and the small joints of the extremities, and left deposits in the tendons and ligaments of the finger-joints. For some time past her breathing had been getting short, especially upon exertion.

The illness, on account of which she sought admission into the hospital, came on five weeks previously with increased dyspnœa, and an attack of gout in her ankles. The gouty attack yielded, but the ankles remained swollen, and from that time her lower extremities and abdomen quickly became dropsical; and the quantity of urine passed, which previously had been considerable, gradually dwindled down to only a pint in twenty-four hours. The whole of the lower extremities were œdematous, and the integuments of the abdomen and of the loins were in a similar state; and a considerable quantity of water had accumulated in the peritoneum, causing great distension of the abdomen. The urine was loaded with albumen.* Pulse very small and weak; heart's sounds feeble

* The existence of so large a quantity of albumen in the urine is quite exceptional in cases of gouty kidney. Two circumstances seem, in this instance, to have contributed to the increase of the albumen; first, a state of acute renal irritation, caused by the recent attack of gout, and, secondly, the dilated condition of the right side of the heart, which favoured venous congestion.

and distant, with a very distinct mitral systolic bellows-sound. The superficial jugular veins were large and distended, and when compressed in the neck did not empty themselves readily on the cardiac side of the point of pressure. She had cough with free mucous expectoration, and a good deal of crepitation was heard throughout both lungs.

Upon microscopical examination by Dr. Conway Evans, the urine was found to contain crystals in such abundance, that everything else which composed the sediment was almost totally obscured; here and there, however, a large and a small waxy cast were seen. The crystals were chiefly thick, yellowish lozenges (uric acid), and large, irregular-shaped masses, apparently consisting of the above-mentioned lozenge-shaped crystals aggregated together. With these there were many of the masses provided with projecting needle-like processes, generally regarded as urate of soda, and also many colourless rectangular prisms; also a good deal of broad pavement-epithelium, probably from the vagina.

The case was regarded as one of gout, with gouty kidney, upon which acute inflammation had supervened. To this was added disease of the heart, consisting of imperfection of the mitral valve, probably from shrinking of the chordæ tendineæ and the fibrous basis of the valve, with dilatation of the ventricles, especially that of the right side; œdema of the lungs; congestion of the liver, con-

sequent on the feeble action of the heart. As a distinct grating was felt on moving many of the small joints of the fingers and toes, it was inferred that their cartilages were replaced by gouty deposit, and it was conjectured that a deposit of the same nature damaged the valves of the heart.

Under the use of diuretics and sudorifics the quantity of urine increased to upwards of a quart for the first ten days, the albumen being still very abundant, and the belly diminished in size. On the 30th a diminution took place to a pint and a half; the pulse rose from 100 to 120, she had passed a bad night, and complained of being much troubled with convulsive movements of the arms and legs.

On the 31st, at six in the morning, she got out of bed and sat up for a short time before the fire, as if she had been chilly. Soon after getting into bed, she was suddenly seized with a fit, in which the whole body was convulsed; she foamed at the mouth, and the tongue was protruded between the teeth and bitten. This was followed by several other fits, each lasting about ten minutes, leaving her in a state of extreme prostration and exhaustion, and apparently insensible, until another fit was about to come on, when she would get up in bed, and answer questions; and expressed herself as feeling very well, and free from pain. Between the fits the pupils remained very much contracted, but during them, they became greatly dilated, and

the eyeballs were drawn upwards and inwards. In twelve hours she had eight fits, and as each lasted about ten minutes, there was an average interval of about an hour and twenty minutes between them.

The head was shaved, a large blister was placed over the occiput and down the back of the neck, and a quarter of a grain of extract of elaterium was administered every three hours. She was allowed small quantities of beef tea and a little wine.

She was soon freely purged by the elaterium, and the fits ceased on the evening of the 31st. On the 1st of June she had quite recovered her consciousness, and from this time she gradually improved, still under the influence of elaterium. The quantity of urine increased considerably, and at the same time free watery discharges were passed five or six times a day from the bowels. The dropsy disappeared, and the heart's action improved in force. On the 29th of June the elaterium was discontinued altogether.

On the 3rd of July the urine diminished in quantity from a quart and six ounces to a pint and a half, and a slight fit occurred in the night; the elaterium was resumed on the 4th. From this time the urine increased rapidly, and the quantity of albumen in it became much diminished. Although weak, she left the hospital on the 20th, being anxious to return home.

This patient continued pretty well until the beginning of October. On the evening of the 6th of that month, she was brought to the hospital quite insensible, and suffering from a succession of epileptic fits, just of the same nature, and as violent as before, but with such rapidity, that the intervals between them did not allow of anything being given, either food or medicine. They continued throughout the greater part of the night, and she died early the next morning, not a gleam of consciousness having shown itself.

The examination of the body took place on the next day. I shall quote merely the description of the kidneys.

The kidneys were small, contracted, and seemed much wasted at the expense of the cortical substance, the cones in many instances reaching almost the very surface of the organ; in some of the cones there were *opaque streaks of deposit of lithate of soda*, taking the direction of the tubes, and probably occupying the canals of some of them. There was no healthy epithelium in any part of the cortical substance; in some situations the cells were filled with oil; in other places they were opaque. The walls of the minute arteries were thickened and hypertrophied. Each kidney weighed only three and a half ounces.

With regard to the immediate cause of death in both these cases (Rapley and Parry), it seems quite clear that that event was brought on by the same in-

fluence which gave rise to the paroxysms of epilepsy; and as the patient had not been epileptic previously, some new cause must have arisen to produce these fits. This was to be found in the deficiency of the urinary secretion, which had almost ceased immediately prior to the first epileptic seizure. The retention and accumulation of urea and other elements of the urine in the blood in an already much vitiated state of that fluid, were quite sufficient to create the irritation of the brain on which these fits depended. And in the wasted and atrophic state of the kidneys which we have described, was it to be wondered at that the urinary secretion should have failed?

How little, then, is to be done by treatment in such cases as these! In the early periods, to support the strength, and excite the secretions of the skin and bowels, as far as could be accomplished with safety, were the obvious indications. But when the kidneys failed—and such kidneys—what could we do? To open a vesicated surface on the back of the neck or on the head might relieve the cerebral circulation of some of the noxious material circulating in it, and so postpone the evil day for a very brief space. To establish any abundant discharge through some other emunctory would be obviously indicated, and would be useful where sufficient strength existed; hence we should have recourse to purging, sweating, or free dilution, whereby not only might the noxious matter be diluted,

but some of the fluid, ready to escape through various outlets, might find its way to the kidneys, and re-establish a little action of those organs.*

I conclude this lecture with some other examples in illustration of the clinical history of gouty kidney, and of the form of gout with which it is associated.

In the following case we were unable to obtain an inspection of the body after death, but the clinical features of the disease were so marked, and especially as regards one of its modes of

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* Case XXXIX.—Shortly after this lecture was delivered, I received a kidney from my friend, Mr. Robert Ceeley, of Aylesbury, taken from an extremely gouty subject. This kidney was in every respect similarly wasted and contracted like that described in the lecture; but, in addition, there *were deposits of lithate of soda in the uriniferous tubes of many of the cones.* The particles of the salt were readily recognised by their peculiar processes (needles), which seem to radiate from a central mass: these are well figured in Dr. Golding Bird's book. They filled up parts of some of the tubes, and here and there appeared to be free among the particles of the epithelium, some of which contained oil in considerable quantity.

Mr. Ceeley informed me that this patient's urine was albuminous, lately scanty but not high coloured, and he had incipient œdema of the right leg. He was carried off by cholera, which was then prevalent in the neighbourhood. The articulations were loaded with chalky deposits, and the cartilages replaced by the earthy indusium, just as in the case described in the lecture. There was also a contracted state of the liver.

elimination, that I am reluctant to withhold the case merely on account of the absence of that link in the chain of evidence, important although it be.

Case XL.—John Lovekin, æt. 38, admitted Oct. 9th, 1852. Ten years before his admission this man was attacked with gout for the first time; it seized upon the great toe of his right foot first, and attacked all the other joints in succession; the attack lasted a fortnight. He attributed it to wearing a pair of tight boots, which injured his great toe by pressure.

Ever since this time he has been subject to attacks of a similar nature, varying in severity and duration, and recurring at very short intervals. He reckoned that he had had as many as a hundred of these attacks.

He stated that as the attack passed away the cuticle of the affected joints would peel off. His urine has always been of a pale colour, and but seldom threw down any sediment.

His last attack took place nine or ten weeks before his admission, at which time his legs became swollen, and pitted on pressure. The swelling did not extend above the knees, and was most evident at night.

The ends of the fingers of both hands contain deposits of chalky-looking matter, which first appeared nine or ten months ago, and all the

small joints of the fingers are damaged by similar deposits, and the articular surfaces grate against each other.

He seems to have inherited the disease from his mother, who was greatly afflicted by it.

Our patient was also suffering, at the time of his admission, from dyspnœa, with rhoncus and sibilus, all through the lungs; the heart's action was weak and very irregular. He had been subject to these asthmatic attacks from boyhood, and appeared to have inherited them from his father. The urine was very copious, of specific gravity 1009, and albuminous.

On the 13th of October, four days after his admission, we noticed a certain wildness in the expression of his face, and he did not readily answer the questions put to him, and had been sick three times since morning.

On the 14th, at 2 P.M., we found him highly delirious, and ascertained that he had been so all night. He was noisy, calling out and speaking incessantly. In the morning he became affected with twitching of the muscles of all the limbs, more especially of the fingers. The movements of the fingers were constant, and the twitchings of the arms succeeded each other at very short intervals, (half a minute or less). The pulse was very irregular and weak, 60; the respirations 20; pupils contracted. No urine had been passed since 6 A.M. During the morning the twitchings in-

creased very much both in frequency and violence, and his strength rapidly failed. At 3 o'clock he seemed to be speedily passing into a comatose state, and he lay on his back gasping and exhausted.

At 2·30 P.M. a drachm of blood was taken from a vein in the arm, for the purpose of testing for the presence of carbonate of ammonia. The blood was allowed to flow into a test tube, and a glass rod was placed in the tube, and held for some minutes over the surface of the blood. Some very slight fumes appeared, but were not more distinct than if the rod had been held over water, with which these fumes were afterwards compared. An equal bulk of hydrochloric acid was afterwards added to the blood, but not the slightest effervescence occurred; not a single bubble of gas could be detected.

The patient was made to breathe for some minutes upon a moistened piece of reddened litmus paper, but no perceptible change of colour took place. A similar piece of reddened litmus was placed in the axilla without change. The mucous membrane within the lips manifested a well-marked acid reaction.

The symptoms under which this patient laboured during the last days of his life, and under which, despite of free blistering, and purging by elaterium, he succumbed, corresponded exactly with those of renal coma from the stoppage

of the eliminatory action of the kidneys. The existence of albumen in the urine, and the low specific gravity of that fluid, which was devoid of lithic sediment, indicated that the kidneys were of the small contracted kind. And the presence of deposits of lithate of soda about and in the joints showed a system thoroughly contaminated by that product of gouty disease, the kidneys sharing fully in the general contamination, and degenerated, no doubt, to a condition precisely similar to that described in S. Tapner's case, (Case X. p. 54).

In the next case we have an example of the gouty paroxysm coming on in a state of constitution much damaged by the gouty poison.

Case XLI.—M. Woodham, æt. 28, a man of intemperate habits; his father and grandfather drank hard, and were martyrs to gout. Intemperance seems to have been a family failing, and our patient was early addicted to it.

His first invasion of gout was at the age of 17. It came on very suddenly in the left ankle, which did not swell much, but was extremely painful. Twelve leeches were applied, which relieved the pain, but the joint has been weak ever since. These attacks have been of very frequent recurrence, and have involved all the joints, there being often no more than three months' interval between one attack and the next.

Within the last twelve months (prior to his admission), this patient got into the habit of taking colchicum to relieve the pain of his attacks. He has found it necessary to take it in increasing doses, and the fits now, instead of lasting a week as at first, usually remain a month or even two. He states that his urine is never high-coloured; but usually pale and in good quantity, and free from sediment.

It was for one of these attacks that he was admitted into the hospital, February 11th, 1851. The left hand and wrist were the joints affected, which were red, swollen, and painful. The phalangeal articulations of both hands were distorted, and could be felt to grate on each other. A similar grating was observed when the bones of the knee-joint were made to move on each other, and it was felt distinctly by the hand placed over the patella. On the second day after his admission the right hand and wrist became affected with gout, and the great toe of the right foot was red and swollen; the right knee was also painful, and its synovial membrane distended with fluid. He had a quick and throbbing pulse, sweated freely, and seemed very low. The urine was abundant, pale, 1010 to 1015 in specific gravity, and slightly albuminous.

This patient was treated by moderate purging with white mixture (sulphate and carbonate of magnesia), small blisters to the joints, and occa-

sional doses of morphia at bed-time. Brandy was given in small doses through the day.

At the end of a week the symptoms had very much abated, and on the tenth day of treatment the gouty swellings of the joints had quite disappeared. On the 3rd of March a small collection of chalky matter was discharged from one of his fingers. This patient remained under observation for six weeks, and left the hospital quite recovered as regards the gouty affection; but during the whole time, and at the date of his discharge, the urine was more or less copious, and albuminous.

The next case affords a good example of the clinical phenomena exhibited in the favourable instances of this affection, and is also worthy of note from the fact that the amount of dropsy was greater than is usually met with.

Case XLII.—William Hunt, æt. 56, admitted into Rose ward, Nov. 4th, 1852 (vol. xxxix. p. 1), a man of intemperate habits, and accustomed to indulge freely in beer and spirits.

He had suffered for the last twelve or fourteen years from gout, and just on his admission was recovering from one of his gouty attacks of about two weeks' duration.

When brought to the hospital he had dropsy, which he first noticed a month previously, when he found his legs, thighs, and scrotum swollen. The swelling has since been gradually increasing.

The following is the description of this man as entered in the Case Book by my clinical clerk :—

"The patient is of a pale, pasty, unhealthy look; he is somewhat emaciated, and his skin is dry; his appetite is not defective, nor does he complain of any thirst. Pulse 84; artery hard and curved on each side. His belly is much swollen, but flaccid, and fluctuation is very marked; its superficial veins are swollen and turgid; the liver does not seem enlarged; bowels confined; chest natural; breath and heart's sounds healthy, except a slight roughness of the first sound of the heart at the apex.

"Micturition is frequent, and in small quantity at each time; about three pints of urine are passed daily. The urine is of a somewhat smoky appearance, of very low specific gravity (1008), decidedly acid, and deposits a little albumen with heat and nitric acid.

"He complains of a dull intermittent pain across the forehead and in the temples; it is most severe when he awakes in the morning. His legs and ankles are decidedly œdematous, and pit on pressure.

"All the joints of his feet and hands, and also his knees, are more or less enlarged; in the right knee, and in some of the finger-joints, there is a quantity of fluid; in the others there is a deposit probably of urate of soda on the articular surfaces, since they grate when moved on each other; there is a similar deposit on the articular surface

of the left patella, which grates very much when moved over the joint."

Examined under the microscope, the urine was found to contain granular and large waxy casts, and a few blood-corpuscles.

Two days after admission this man had an attack of gout in his right wrist and hand, which had the effect of increasing the smokiness of the urine, owing, doubtless, to an escape into it of a greater number of blood-corpuscles.

Under the free use of alkalies, aperients, and some Dover's powder at night, and a blister to the wrist, this attack yielded completely in four days. The urine, which had diminished under the attack, now increased in quantity,—two pints and a half daily; specific gravity, 1008; less smoky.

On the 12th of November the urine reached three pints and a half, specific gravity 1007, acid, light coloured, slightly turbid, the smokiness had vanished, but albumen was still present in small quantity; the abdominal swelling was diminishing, the anasarca was gone, and the articular effusions had quite disappeared. The right patella was found to be rough like the left. He was then taking ten grains of the bicarbonate of potass in an ounce and a half of water thrice a day, and five grains of the compound colocynth pill every night. On the 25th the report states, "urine from three to five pints for the last four days; the fluid in the abdomen is still considerable."

Ten grains of compound iodine ointment were ordered to be rubbed over the right hypochondrium twice a day. On the 29th, a decided diminution was observed in the size of the belly. The quantity of urine passed was never less than three pints.

On the 13th of December the signs of fluid had disappeared, and he was now quite free from a day. All remedies were omitted, excepting one grain of quinine in a state of solution thrice daily. A large quantity of urine continued to be voided daily, sometimes as much as six pints in the twenty-four hours.

On the 20th of December this patient left the hospital free from both gout and dropsy, the articular surfaces remaining as before, roughened by the deposition of urate of soda and the absorption of their cartilages. The urine was still very abundant, of specific gravity 1008, acid, and containing albumen in small quantity.

Case XLIII.—In the spring of the present year I attended a gentleman, æt. 56, who exhibited in a striking manner many of the clinical features accompanying this pecular disease of the kidneys, and the form of gout in which it is apt to occur.

This gentleman had spent the earlier years of his life in Ceylon, where he had not suffered from any illness. He returned to this country at the age

of 45, and very soon after began to suffer from attacks of gout. He was not at all addicted to high living, nor to much indulgence in wine or beer, but appears to have been very moderate in his habits.

The gout at first attacked the joints of his feet and ankles, and afterwards the knees. Subsequently it affected the hands and wrists. The attacks were extremely painful. With the view of eradicating the disease, the patient gave up all alcoholic liquors, beer, wine, &c., and became a complete tee-totaller. And finding no relief to his pain except under the use of colchicum, he took Blair's pills very freely, and became an enthusiastic patron of that empirical preparation, which is known to consist chiefly of the acetic extract of colchicum.

Notwithstanding his diligent use of this drug, which he was led on to take in gradually-increasing doses, the gout gained ground, and attacked all the large as well as the small joints of his extremities. Urate of soda began to be deposited in them, replacing the articular cartilages; and considerable accumulations of this substance were formed outside the joints in the subcutaneous areolar tissue. It was deposited largely beneath the skin of the thumb and fingers, and especially at their points, and disfigured them considerably.

Mr. P—— was in this state on arriving in town, about the middle of March, 1856. Notwithstanding the constant use of colchicum, and abstinence from

fermented liquors, he experienced a fresh attack of gout every alternate day in one or more joints; while there were also indications of its affecting the heart, and threatening the stomach. The pain was so acute that his nights were quite sleepless.

To relieve the sleeplessness, his medical attendant gave him a small dose of Dover's powder. This produced an effect so much out of proportion to the magnitude of the dose, that I was asked to see him.

I found him in a lethargic condition, very much as if he were suffering from an overdose of opium. The pupils were contracted, and, although he was easily roused and clearly apprehended the questions put to him, his eyelids dropped as he answered them, and he seemed every moment falling off to sleep.

His complexion was sallow; the subcutaneous tissue was everywhere contaminated with urate of soda deposits, which were accumulated in large amount at the points of the thumb and fingers, giving them a remarkably club-shaped appearance, and also about the wrist and elbows. Under the skin of the external ears, where they are not uncommonly met with, they were in larger masses than I had ever before seen in those parts. There was slight puffiness of the ankles, indicating a tendency to anasarca.

The urine had fallen in quantity considerably below the natural standard; it was pale, and slightly smoky, and quite free from sediment;

of acid reaction, and distinctly, but slightly, albuminous.

I had no difficulty in coming to the conclusion that this patient was labouring under the form of renal disease described in the lecture, and that at that moment he was suffering from a semi-comatose state, due partly to the defective action of the kidneys, and partly to the influence of a very small dose of opium, of which his peculiar condition rendered him unusually susceptible.

The object of treatment was first to relieve this semi-comatose state by promoting elimination, and secondly to prevent the frequent recurrence of the attacks of gout. With the first view he was freely purged by equal parts of the compound camboge and colocynth pills, and the citrate of ammonia was given in effervescence, allowing an excess of alkali, partly to obtain the influence of ammonia as a diffusible stimulant, and partly to promote the action of the kidneys. To ward off the attacks of gout, I insisted on the abandonment of colchicum, to which he yielded his consent with great reluctance, and, equally against his will, I prescribed for him frequent small doses of brandy and other nourishment, in regulated quantities.

Under this treatment, after the second or third day, the attacks of gout ceased, the bowels were freely acted upon, and the kidneys began to secrete abundantly; but the urine was pale, without sediment, and contained albumen in small quan-

tity. The amount of this secretion increased to five or six pints daily. Concurrently with these changes our patient quickly lost his semi-comatose state; his nights became much better, and were greatly assisted by his being placed on a water bed. After ten or twelve days he was out of danger.

From time to time I took the opportunity of opening, with a lancet, the collections of urate of soda which so much deformed his fingers, and promoted the free discharge of that substance in a semi-liquid state. As he was well and carefully supported, the wounds healed most kindly, and the fingers were restored to their natural shape.

I attended this gentleman for upwards of two months along with Mr. Broxholm, and he left town in a very much improved state of health, and quite free from gout; but the kidneys continued to act in the way which is so characteristic of gouty disease of these organs.

He went to Brighton, and continued to improve for some time. After an incautious exposure to the east wind, he was attacked by influenza, during the course of which malady symptoms became developed which I interpreted as due to gout attacking the heart. The action of that organ became frightfully intermittent, and the patient gasped for breath as in angina pectoris. In one of these attacks he died, apparently from severe spasm of the heart.

LECTURE XIII.

On Cases in which Pus is found in the Urine, and on Gouty Inflammation of the Bladder.

GENTLEMEN,—The occurrence of such a product as pus in the urine is in itself a formidable and an alarming sign, and it is most important that you should be able to determine precisely the source whence it comes. It is very essential to your success as practitioners that you should not postpone, until a case presents itself, making up your minds as to the conditions which may give rise to so serious a modification of this important secretion. I propose, therefore, to bring this subject before you in this and my next lecture.

We have at present in the hospital two very interesting cases of this nature. One is that of a man named Rickman, in Sutherland ward; the other is that of a young woman, named Jenkins, in Lonsdale ward. Both these persons are passing pus in their urine, but under different circumstances. The presence of pus, however, in the urinary secretion is the prominent feature in both cases. We speak of pus in the urine generally, just as we speak of blood or of albumen in this fluid; and we find that the presence of

either of these substances must be regarded not as the essence, but as a symptom, and undoubtedly a most important one, of the disease.

These two cases resemble each other only in the fact of the presence of pus in the urine; they differ in the nature of the malady under which the patients are suffering, for in each case the pus is derived from a different source, and under conditions which require a very different plan of treatment.

Before I go further, let me say a few words on the means at our command for detecting the presence of pus. Suppose a specimen of urine is brought to you in which pus is suspected to exist, how do you proceed to detect the pus? and how can you distinguish it from other deposits which we know present to the naked eye appearances not unlike those of this product? The remarks which I shall make on this point will apply to those cases in which we have a fair amount of pus present,—a quantity, in fact, sufficient to form more or less of a deposit evident to the unaided eye.

Urine containing pus, then, generally exhibits a certain cloudiness or muddiness, so that when you hold it up to the light you cannot see through it; the clear, transparent appearance of the healthy secretion is absent. If you have an opportunity of inquiring into the circumstances under which this urine is passed, you will find it

has been muddy from the moment when it was passed, and that it has not become so after standing for some time. This constitutes another distinctive character of urine containing pus, and enables us to distinguish it from urate of soda, which sometimes forms a deposit that exhibits much of the general appearances of pus; for the urine from which the urate of soda is deposited is almost always perfectly bright and clear when first passed, and becomes turbid only after it has cooled, the urate of soda being generally perfectly soluble in the secretion while warm. Hence you should always be particular to ask the patient if his urine is clear when passed, unless you have an opportunity of seeing and testing it yourself; but this we are frequently prevented from doing, and it becomes important, therefore, to gain as much information as possible with reference to this very important symptom. If the urine be clear when passed, and becomes muddy only after standing, we may lay it down that the turbidity depends upon urate of soda, and not upon the presence of pus. Sometimes, indeed, a notable quantity of the alkaline phosphates is precipitated from urine previously clear, but this is the exception rather than the rule.

Purulent urine, besides possessing this muddiness, has the additional characteristic, that after a time a deposit from it collects at the bottom of the vessel, and forms a layer, varying in thickness,

(according to the quantity of pus present,) of a yellowish green material, which has a creamy consistence. This deposit leaves the supernatant fluid more or less clear, according to its greater or less completeness; but frequently the urine continues to hold a small quantity of pus in suspension, which creates a certain amount of turbidity or milkiness in the supernatant fluid. If the urine be allowed to stand for some time, this greenish layer of pus undergoes certain changes, by which the decomposition of the urine is brought about; and the fluid soon becomes alkaline, owing to the presence of carbonate of ammonia, generated by the decomposition of urea. At the same time, the alkali, thus developed, re-acts in a peculiar way on the pus, which is observed to become thick, viscid, and ropy, and to lose its minutely granular appearance, becoming more or less transparent, and forming what has long been described as *glairy mucus*. It has been found that potash (and I believe the observation was first made by Dr. Babington) also re-acts in this manner upon pus, and, in consequence, it becomes a valuable reagent to enable us to detect the presence of this substance.

Here is a specimen of urine exhibiting the general characters which I have just described as being distinctive of purulent urine. You see there is an abundant creamy-looking deposit; and if I pour off the supernatant fluid, and add a little of

this liquor potassæ, you will perceive the change occur which I have just mentioned. As I shake the vessel, you observe the deposit becomes tenacious and glairy, so that, when I attempt to pour it into another vessel, it does not drop, but runs off in a viscid stream, very like uncoagulated white of egg; indeed, many persons might mistake this glairy mass for white of egg. Pus altered in its character in this manner by the carbonate of ammonia, set free by the decomposition of urea, was, until of late years, ordinarily considered as a deposit of glairy or *ropy mucus;* but it has since been shown that mucus never assumes this particular form of a ropy sediment, which sinks to the bottom of the vessel; nor does it ever exist in the urine in such quantity as we frequently find this altered pus.

I have said that purulent urine is always muddy; but this is not a character by which we are enabled with certainty to say whether or not a given specimen contains pus. Urine may be muddy from other causes; for example, it may exhibit a muddy appearance, as soon as it is passed, from the presence of other deposits besides pus. Phosphatic urine is very frequently muddy, and often much resembles purulent urine; but generally it appears paler than the latter. After phosphatic urine has been standing for some time, a deposit will be found just such as occurs in purulent urine; but, in the former, the deposit usually presents a white instead of a yellowish colour,

and it is flocculent and light, instead of being thick and heavy. We also observe this very important difference between these two forms of deposit, that the addition of a little acid renders the phosphatic urine perfectly clear, while it increases the turbidity of the other. This re-action will always enable us conclusively to distinguish between a specimen of urine muddy from the presence of pus and one which is rendered turbid by the precipitation of phosphates. Phosphatic deposits are all readily soluble in dilute mineral acids, and are precipitated again from the acid solution by ammonia. Purulent deposits are not dissolved by dilute acids; but the turbidity becomes greater, owing to the precipitation of a little albumen from the liquor puris. Another distinctive character of urine containing a considerable amount of phosphatic deposit is, that it is usually, though not always, alkaline; while purulent urine more frequently exhibits a slightly acid re-action, at least when quite fresh, or it may be neutral; but we do not often meet with urine of this description of a strongly acid re-action, unless the patient is taking at the time large quantities of mineral acids. Then, as I mentioned to you just now, we have in alkalies a most excellent and easily-applied chemical test, which will enable us with certainty to discriminate between these deposits; and liquor potassæ has been found the most convenient alkali which we can use for the purpose,

as it will keep well, and requires no great profundity of chemical knowledge in its application; and, so far as I know, it is not open to any sources of fallacy.

There are other points distinctive of urine containing pus. If we apply heat to the clear fluid after the subsidence of the deposit, it will coagulate, and the amount of coagulation which takes place will be in direct proportion to the quantity of pus present. This will take place if the urine be acid; if it be alkaline, you must acidulate it before heating it. The albumen is derived from the liquor puris, and hence purulent urine is always albuminous, and it is albuminous because purulent.

For an additional and unequivocal test of pus, you must look to its physical constitution. Pus consists of two essential parts, *the liquor puris*, and *the pus-corpuscles*, the latter being held in suspension in the former, just as the blood-corpuscles are suspended and float about in the liquor sanguinis. The *pus-corpuscles* or *pus-cells* are readily recognised by the microscope. If a specimen of urine contain albumen, that substance may be derived from the liquor puris, and may, therefore, be indicative of the presence of pus, or it may be due to the escape of serum only, as occurs in the various forms of chronic renal disease. This point may be at once settled, as regards the presence of pus, by examining a drop of the turbid urine under the

microscope, when we shall not fail to recognise the pus-corpuscles, if this product be present in the urine. These particles are much larger than the red corpuscles of the blood, and differ from them in shape, being globular, while the latter are biconcave discs. They much resemble the colourless corpuscles of the blood, but appear darker and more highly granulated. This granular appearance seems to be owing to the presence of numerous highly refracting molecules in the pus-corpuscle, which are of a fatty nature; and to them, most probably, the change which occurs on the addition of liquor potassæ is due, the fatty matter being converted into a soap by the alkali. When treated with acetic acid, the pus-corpuscles exhibit two or three circular bodies in the centre, having much the appearance of oil-globules. Some corpuscles are found to contain three or four of these bodies; others two, and in some one only can be detected. The presence, then, of particles like these will enable you to distinguish pus from all other deposits which occur in the urine.

We have also to distinguish the pus deposits from deposits of mucus. Mucus seldom forms a distinct stratum, like pus; if viscid, it is so when the urine is acid; but pus exhibits the glairiness, which renders it liable to be mistaken for mucus, only when the urine is alkaline. If we examine mucus under the microscope, we shall not fail to detect more or

less of epithelium, and the so-called mucus-particles in small numbers, which, doubtless, are incipient pus-corpuscles. Mucus, again, does not re-act, like pus, with solution of potash, and it is soluble, to a great extent, in acetic acid. Further than this, the liquor muci appears to be always free from albumen, a substance which, as I have already remarked, the liquor puris invariably contains in greater or less quantity.

Having considered the more prominent features of deposits of pus as they occur in the urine, let me say a few words upon the various sources from which the pus may have found its way into this excretion, and the circumstances which may give rise to its formation. The pus may be developed from the lining membrane of any of the surfaces over which the urine has to flow as it passes from the kidneys, or in contact with which it has to come. It may come from the urethra in the male; and in the female it is often derived from the mucous membrane of the vagina. When we examine the urine of a female, and find pus present in it, we should always be careful to inquire if leucorrhœa be present, and in very many cases this will be found actually to be the case. It therefore becomes important to keep this in view, for I have known many persons much puzzled from this simple circumstance. They have found pus in the urine, and have been unable, from the absence of other symptoms, to

draw any conclusions with reference to its origin. Pus may likewise come from an adjoining abscess which has opened into one of the urinary passages. An inflammatory state of the mucous membrane of the bladder is one of the most common causes of the presence of pus in the urine; and inflammation of the ureter, and of the pelvis of the kidney (*pyelitis*), will also give rise to it; and, though last, not least, suppurative inflammation of the kidney itself. The presence of a calculus in the kidney may cause pus to appear in the urine by creating irritation and inflammation around it.

When the quantity of pus discharged is considerable, I do not know of any particular feature, either of it or of the urine, by which one may determine whether the pus comes from an abscess in the kidney, or from some of the surfaces over which the urine passes, as the pelvis of the kidney, the ureter, or the bladder.

There is a curious difference, and a very marked one, between the two cases which are now in the house with reference to the occurrence of triple phosphate in the urine. The woman Jenkins, in Lonsdale ward, has been passing large quantities of pus for some months, in which crystals of triple phosphate cannot be detected; and, from other signs, we should be disposed to infer that the purulent matter comes from an abscess of the kidney. On the other hand, in the urine of the man (Rickman)

in Sutherland ward, we have always observed a considerable quantity of the triple phosphate, and there can be no doubt that he is labouring under an inflammatory state of the mucous membrane of the bladder, and that that membrane is the source of the large quantity of pus which is found in his urine. Whether the difference of the source of the pus has aught to do with the absence of alkaline phosphate in one case, and its presence in the other, is an interesting question.

It has been stated by Prout, that an irritated portion of the urinary mucous membrane is apt to secrete phosphate of lime. May there not be a similar tendency to the formation of triple phosphate? I think this question must be answered in the negative, and confess our present inability to refer the difference to any satisfactory cause. Abscesses, formed in the neighbourhood of the urinary passages, and opening into them, may furnish pus to the urine. Thus a prostatic abscess may burst into the urethra, or a lumbar abscess may open into the ureter.

Let me now direct your attention to one of the cases which have led me to take up this subject to-day. It is that of the man named Rickman in Sutherland ward.

I may here state, *in limine*, that Rickman appears to me to be labouring under gouty inflammation of the bladder. Gout may occur in the bladder, as it does, undoubtedly, in the stomach;

and the symptoms of gout in the hollow viscera are highly interesting, and deserve your attentive consideration.

Case XLIV.—(Vol. xxxiii. p. 185.) Our patient is 44 years of age. The history of the first part of this patient's illness, as recorded by Mr. (now Dr.) Bridgewater, is very much the same as that of all those who, in common phrase, "earn the gout for themselves." He was in early life a butler, and accustomed to drink freely of ale and gin. Having subsequently entered the police force, he was compelled to diminish his potations. He did not remain long in this line of life, and soon abandoned it for the business of keeping cows in the neighbourhood of London. In this vocation he has been engaged for the last five years; and, during that time, he has not lived so well as formerly, still, however, contriving to drink largely of porter.

Despite his bad habits, he enjoyed very good health until ten years ago, when he was seized with his first attack of gout. This came, as it so often does, first in the great toe. It was not, however, confined to that joint, but attacked subsequently the ankles, knees, and wrists, shifting its position from one to the other. In subsequent attacks, of which he had four or five in the course of each year, it would sometimes exhibit this shifting character, and sometimes attack all these joints simultaneously. The tendency to

shift is an important feature in the case, for it is where the disease exhibits this proneness to wander that we most frequently find it attacking internal organs, especially hollow viscera, such as the stomach and the bladder. During the last ten years, then, this man has been subject each year to several similar attacks. About seven years ago, during a period of intermission between his attacks, he was one day seized, after a long walk, with violent pain in the bladder, accompanied with difficulty of micturition; and, when he came to examine the urine which he had passed, he discovered blood in it. He immediately sought for medical assistance, fomentations were freely used, and he took some medicine, under which the attack subsided in a few days.

What, then, can we pronounce this attack to have been? Was it caused by the sudden entrance into the bladder of a renal calculus, which had previously created no disturbance? or by a vesical calculus, which now for the first time announced its presence? The fact, that the patient had evinced no previous symptom whatever of either renal or vesical calculus tells very much against both these views. The mode of access and the course of the attack comport with what we know of the clinical history of gout, as it affects acutely either joints or hollow viscera. The rapidity or suddenness of its invasion is the most striking feature, and especially as occurring in a highly

gouty subject, whose gout is of the asthenic and erratic kind. Add to this, that the attack was of short duration, and yielded in a few days to medical treatment, and you have another strong point against its being due to the mechanical irritation of a foreign body, such as a calculus, of the expulsion of which from the bladder there was no evidence. Under these circumstances I am disposed to view this attack as one of gout in the bladder—that viscus being seized suddenly, just as a great toe or any other joint is, in the ordinary acute attacks of this disease. The inflammatory state of mucous membrane excited a rapid development of a high degree of congestion of that membrane, some of the vessels of which giving way, allowed the escape of some blood, and caused the hæmaturia which accompanied the attack.

Since this first attack in the bladder, our patient has been subject once a year to one in all respects similar, coming on in the same way and yielding as speedily to treatment, but not leaving the bladder quite unscathed. Were the vesical symptoms due to a mechanical cause, there can be no doubt the attacks of pain in the bladder, etc., would have been very much more frequent.

For the last three years our patient has been disabled from work by weakness of the knees and ankles, the fibrous structures of which are a good deal thickened; and during this period he has had some severe attacks of gout.

About three months before last Christmas (not having had an attack of gout for six months previously) he was seized with pain in the left lumbar region, which for three days continued very severe, and was accompanied with discharge of bloody urine, and with pain at the end of the penis and itching along the whole course of the urethra after micturition. From this attack he got quite well under medical treatment, but in February he was again seized in a similar manner, the pain being referred to the loins, and blood being passed with his urine. From that time until his admission into this hospital (May 14, 1851) he has suffered more or less from these symptoms, the blood disappearing from his urine occasionally for a whole week.

On admission we found him complaining of pain in the back, especially in the left lumbar region, slightly increased by pressure, and also of pain in the bladder more severe than that in the back. This latter pain was most distressing when the bladder contained urine. The power of retaining the urine was a good deal impaired, partly, no doubt, because of a highly irritable state of bladder, and partly in consequence of a weakened condition of its sphincter.

The urine had a decidedly smoky colour; its specific gravity was 1012, its reaction alkaline, and it contained blood, as ascertained by the microscope, and pus in considerable quantity. The man

stated positively that he never observed any indication of gravel, and never passed any calculus. The quantity of urine passed in twenty-four hours was about two pints. To relieve the irritable state of the bladder, he was ordered a starch enema, with ten minims of tincture of opium every night, and was put upon dilute nitric acid, beginning with ten minims thrice a day in water.

He had only been two days in the hospital when he was attacked with gout in the thumb of the right hand, and three days afterwards (May 19th) the right knee became similarly affected, and a copious effusion took place into it. Both ankles were also attacked on the evening of the same day. When the articular affection was thus developed, the pain in the back and bladder became decidedly mitigated. The urine, however, still retained the same characters—it was of low specific gravity, alkaline, and contained blood and pus.

Now, the points which we had to determine in this case were these, first, the source of the blood and pus; secondly, the nature of the pain in the back; and, lastly, the actual state of the bladder.

Observe that all the symptoms which this patient exhibited might have been caused by the irritation of a calculus in the kidney, or of a calculus in the bladder.

I have already stated to you my reasons for believing the former attacks in the bladder to have been due to gouty inflammation of that organ, and

not to the presence of a stone in it. The existence of a calculus in the bladder might easily have been ascertained by sounding; but our patient had a very contracted state of urethra at its orifice, and for some distance behind, which rendered it very difficult to introduce an instrument, even of the smallest size. We, therefore, for the present, contented ourselves with relying upon the evidence of general symptoms.

If the view which I took of the bladder affection were correct, it would indicate that the lumbar pain was probably due to a similar gouty inflammation or irritation of the ureter, and perhaps in some degree of the kidney likewise, and that it was caused by an extension of the vesical inflammation to the ureter, and perhaps also to the pelvis of the kidney.

Our three points, then, on this view of the case might be thus explained :—

First, the source of the blood and pus is, and has been all along, the bladder; perhaps, also, the ureter; secondly, the pain in the back is referable to gouty irritation of the kidney and ureter; and, thirdly, the mucous membrane of the bladder is in a state of chronic congestion and inflammation, the subject of frequent hæmorrhages, and secretes pus.

But you will ask, how do I determine that the pain in the left lumbar region is not caused by a renal calculus, and that the kidney may not be

the source of the pus? The relation of time which the vesical and renal symptoms bear to each other is strongly opposed to the suspicion that a renal calculus has been at the bottom of his illness. The symptoms were distinctly referable to the bladder long before any lumbar pain was manifested. The annual attacks of gouty inflammation of the bladder from which our patient suffered were, as you will remember, among his earliest symptoms. Now, these attacks are not to be explained on the supposition of the existence of a calculus in the kidney, more especially in the absence of symptoms pointing to disturbance in that organ. The symptoms of renal calculus, *while it is yet in the kidney*, are generally sufficiently distinct—you will have more or less pain in the back; probably, also, bloody micturition to a greater or less extent, and, when the stone begins to move down, more or less pain, both in the loins and along the ureter, according to its size and the resistance which its passage encounters; sometimes, also, sickness, vomiting, and even hiccough occur, with not unfrequently retraction of the testicle. A renal calculus, however, may excite inflammation and abscess of the kidney, and so may cause discharge of pus and blood; but in such a case you will not have so complete nor so long an intermission of symptoms as in the present instance, nor will you have those symptoms referred solely to the region of the bladder.

A calculus may be impacted in the kidney or ureter, and cause no pain so long as it is stationary; when it begins to move, however, the pain and the disturbance begin. If it fix itself again, these symptoms may cease.

Case XLV.—You had a good illustration of this not very long ago, in the case of a man named Steventon, in Sutherland ward, who died of phthisis. Some weeks before his death he complained of pain in the back, and of very marked pain down the course of the ureter on the right side. For some time these symptoms disturbed him a good deal, but they subsided altogether three weeks before his death. I made the diagnosis of a calculus in the kidney or ureter on that side; and, after death, we found one, as large as an almond-shell, tightly impacted in the right ureter, about an inch from its opening into the bladder. The ureter and pelvis of the kidney were much dilated above the point of obstruction, and the kidney was beginning to become sacculated. In this patient there was a slightly irritable state of the bladder, owing, no doubt, to the stone passing down so near to that viscus; but these symptoms subsided when the stone became impacted and quiescent; and you will observe, also, that the vesical symptoms *followed* the pain in the back and along the course of the ureter. It is otherwise with our patient, Rickman; with him the vesical symptoms were long antecedent to the lumbar affection; and, if a calculus exist (which

is quite possible), it is probably in the kidney, and may have excited a separate inflammation of that organ, distinct from the bladder affection.

I attach much importance in the diagnosis of such a case as Rickman's to the attacks of gout being asthenic and erratic; for it is in these cases that gout is most disposed to fly to internal organs. Gout, even when apparently sthenic, will attack the bladder, the stomach, or the heart, when treated by depressing means. Of this the following is a good example:—

Case XLVI.—A friend of mine, of very robust make, but overworked in laborious professional employment, had a severe attack of gout in one foot. He had previously suffered from it on many occasions. Being much in request in his profession, he was impatient to get well, and, contrary to his better judgment, allowed a number of leeches to be applied to the gouty foot. The leech-bites bled freely, and next day he found that the active gout had quitted that foot, leaving it very weak, and had settled in the other. This latter swelled up quickly, and so intense was the inflammation that a neighbouring surgeon, thinking that matter had formed, made an incision, which bled freely. On the following day both feet were free from gout, but the bladder had become irritable, micturition was painful and frequent, and the urine contained bloody mucus. The vesical irritation yielded in a few days, and now the action of the heart became

frightfully irregular and intermittent; and, notwithstanding that the gout was on more than one occasion successfully invited to the extremities, it was many months before the heart's action was restored in strength and rhythm.

The view which I have taken of our patient Rickman's case is, I think, confirmed by the subsequent history. The treatment with which we began was persevered in,—the opiate enema, the dilute nitric acid,—which, after a short time, was given in decoction of Pareira brava, and the dose gradually increased to thirty or forty minims. Fomentations were frequently applied over the region of the bladder, and counter-irritation was established in the same situation by mustard. The gouty joints were wrapped up in wool, so as to promote sweating, and small blisters were occasionally applied to them. A sedative and sudorific draught was frequently administered at bed-time.

Under this plan of treatment the general gouty state became decidedly less, the joints recovered themselves, the irritable state of bladder diminished, and the quantity of purulent discharge in the urine was much reduced; still the alkaline condition remained, and the pus, although in greatly diminished quantity, continued. This, I believe, was attributable to the impediment which existed to the free evacuation of the bladder, by the contracted state of the anterior extremity of

the urethra, caused by an inflammation of that part of the canal in our patient's boyhood; and, accordingly, means were taken to diminish and remove this impediment by daily dilating the urethra. By perseverance in the dilating process the urine is improving much in quality, and I cannot doubt that, ere long, it will become quite natural.

When you find pus in the urine, and have reason to suppose that it comes from the bladder, it is a point of primary importance that it should have a free exit. Urine retained in the bladder becomes a source of irritation to that organ, by becoming decomposed, and developing carbonate of ammonia. It is in this way that we get ammoniacal and purulent urine in paralysis of the bladder from spinal disease. The retained urine becomes decomposed, inflammation of the bladder is excited, and pus is generated, which is made viscid by the alkali which is formed from the decomposed urea.

I shall continue this subject in my next lecture.

LECTURE XIV.

On Gouty Inflammation of the Bladder, and on Cases in which Pus is found in the Urine.

In my last lecture, gentlemen, I began to call your attention to some of those cases in which pus makes its appearance in the urine, having first pointed out to you many of the sources whence the pus may enter this secretion. The case of Charles Rickman, in Sutherland ward, afforded us an instance of an affection of the bladder, giving rise to the formation of a large quantity of pus; and we had reason to believe that it was due to an inflammation of the vesical mucous membrane, which was of a gouty character.

From the history of this patient, we found that he had suffered from several attacks of gout, which alone might lead us to suspect that the bladder affection was of this particular nature. The mode of accession of the acute symptoms, as well of the bladder as of the joints, was peculiarly characteristic of a gouty affection; inasmuch as the bladder attack was sudden, and without warning, and the articular affection exhibited an erratic character. You have had an opportunity of watching this case for some time, and most of you are, no doubt, aware that the

patient suffered from a stricture at the anterior orifice of the urethra, which, by preventing the free exit of the urine, kept up the irritation of the bladder. For this reason, the disease still remains uncured; but, in the main, our treatment has been successful. The stricture, by preventing the free passage of the urine, keeps up an irritable state of the bladder, so that this viscus refuses to retain even a small quantity of urine, and hence a necessity for very frequent micturition results. The urine is, however, now acid, having been, as you know, for a considerable time, highly alkaline,—so alkaline, indeed, as to produce a characteristic reaction on the pus-globules. This, as I before explained to you, consists in the transformation of the purulent deposit into a thick and glairy jelly-like mass, the so-called glairy mucus, and is the result of the action of all alkalies on this substance. Under the long-continued use of the dilute nitric acid, gradually increased to large doses,—sometimes given with decoction of Pareira, sometimes with infusion of buchu,—and the exhibition of opium, chiefly by enema, the irritability of the bladder has greatly diminished, and the gouty symptoms have been subdued; and the patient will, I doubt not, ere long leave the hospital quite well.*

* This patient remained in the hospital from the middle of May to the end of July, and was discharged quite free from all vesical irritation, and able to pass water in a good stream.

In connexion with this case, let me offer a few remarks on the occurrence of gout in the bladder, and describe to you some of the forms in which it affects this organ. I shall confine myself, in these remarks, to what I have myself observed in cases which have from time to time been brought under my notice.

Gout appears to me to affect the bladder in four different ways :—

1st. It manifests itself as a distinct and very obvious inflammatory affection; and this was the form in which it occurred in our patient Rickman. I apprehend that, in these cases, the mucous membrane of the bladder is red and inflamed, presenting, indeed, the ordinary appearance of a mucous membrane in a state of inflammation. It is a condition, however, which must be distinguished from inflammation of the bladder, as excited by other causes, and unconnected with any specific poison. Gouty inflammation of the bladder is an analogous affection to gouty inflammation of the lungs, gouty bronchitis or pneumonia, and gouty inflammation of the stomach. In cases of this kind there is a great tendency to the secretion of pus by the mucous membrane of the bladder. If there be any difficulty in the free evacuation of the pus, the urine becomes alkaline, from the retention of a small quantity of the secretion, and the subsequent decomposition of the urea; the highly alkaline urine, in its turn,

keeps up the irritability of the bladder, and promotes the secretion of more pus. In this way, either a weak or paralytic state of bladder, an enlarged prostate, or a stricture in the urethra, (as likewise exemplified by the case of Rickman,) may stand in the way of the complete restoration of this organ to its healthy functions.*

2nd. Gout occasionally attacks the bladder in a different manner to that last described, so as to produce just the opposite effect as regards the urine, namely, incontinence. A gouty man becomes troubled with great frequency of micturition, and we find that this symptom depends upon a highly sensitive state of the vesical mucous membrane, which leads ultimately to an inability of that organ to retain the urine, due, not to a paralytic condition of the sphincter vesicæ muscle, but to the bladder being impatient of its contents. In this form, the sensibility of the mucous membrane is much exalted, and the bladder becomes intolerant of the presence of the smallest quantity of urine, so that the evacuation of its contents is constantly taking place at short intervals. The prominent symptom, then, in such cases, is frequent micturition of small quantities, the urine

* A striking example of this form of gout is referred to in the preceding lecture, p. 363. In that case the rapid transference of gout from the foot to the bladder was as obvious as it so often is in being transferred from one joint to another.

passed being pale, acid, and devoid of mucus or pus; but not unfrequently albuminous, owing to the existence of gouty disease of the kidneys.

It is difficult to define the exact pathological condition of the mucous membrane of the bladder in this affection. It appears to be an irritable rather than an inflammatory state,—a condition in which the sensibility of the mucous membrane of the bladder is greatly exalted, owing to the influence of the gouty poison, which seems capable of irritating the bladder just as cantharidine does. Doubtless there is frequently also in these cases an irritated state of kidney with which the bladder sympathizes. The cases in which it is apt to occur are generally in elderly persons, whose systems seem thoroughly imbued with gout, and in whom deposits exist in the joints, in the tendinous sheaths, or in the arteries. It occurs in old persons, and often accompanies enlargement of the prostate gland. Sir Benjamin Brodie describes cases, which I suspect are of this nature, the primary cause of the symptoms being gout. "An elderly man," he says, "complains of frequent attacks of giddiness. Sometimes, in walking, his head turns round, so that he is in danger of falling; and this symptom, probably, arises from an altered structure of the arteries of the brain, causing an imperfect state of the cerebral circulation. This state of things is sometimes attended with an irritable condition of the bladder, and although

the urine is of a healthy quality, and the bladder itself is free from disease, the patient is tormented with a constant micturition, voiding his urine without pain, but at short intervals, and in small quantity."*

3rd. A third class of cases exhibits a condition the opposite of that which I have just described, in which, instead of the patient being unable to retain even a small quantity of urine in his bladder, he is suddenly or rapidly affected with an inability to pass water, and the bladder becomes distended in consequence, causing great pain and suffering. The essential difference between these two conditions consists in this, that in the former case the mucous membrane is rendered highly irritable by the gouty poison, and kept so, possibly, by some irritating quality of the urine; but in the latter case the muscular coat is the seat of the affection. There is ample evidence to show that muscles may be attacked by the rheumatic, or by the gouty poison. Thus, in subjects of gouty diathesis, it is not uncommon to meet with sudden and severe affections of external muscles, accompanied with constitutional disturbance similar to that of acute gout. I am just now attending a nobleman in whom very decided constitutional disturbance, accompanied with distressing intermission of the heart's action, pre-

* *Lectures on the Diseases of the Urinary Organs*, p. 94.

ceded for some time the sudden appearance of a very painful inflammatory affection of the same portion of the gastrocnemius muscle on each side, which came on in the sudden way in which gout is apt to do. This patient passes uric acid in large quantities, not only as urate of soda, but as uric acid gravel, and he has discharged many uric acid calculi. Lumbago is an instance of gouty affection of muscles. The intercostal muscles are often similarly attacked, giving rise to a most painful affection, which occasionally ends in pleurisy, or even pleuro-pneumony. Just in the same way gout may attack the muscular fibres of the bladder, stomach, or colon; and in the cases of retention of urine such as I am describing, it affects the muscular coat of the bladder so as to paralyse it, in a manner probably somewhat analogous to that in which the active principle of belladonna affects the circular muscular fibres of the iris, and allows the pupil to become dilated.

Case XLVII. — Let me relate to you a case in illustration of this form of gout in the bladder. A barrister of great eminence in his profession was obliged to return to town from his circuit, where he was largely employed, and, indeed, overworked. He had been seized with severe muscular pains in the thighs and loins, which I regarded as gouty. The patient was of a gouty family, generated uric acid freely, and had passed a considerable quantity

of uric acid gravel. On a former occasion, I had attended him for one of those attacks of sudden affection of the intercostal muscles, (muscular gout, as I would call it,) passing on to dry pleurisy. For these reasons, I was justified, I think, in regarding and treating these pains as gouty in their character. After he had been three or four days under treatment for this affection, he found one morning, on attempting to empty his bladder, that it refused to discharge its contents. A complete paralysis of the bladder had taken place, and evidently not from too great distension, as the patient did not suffer much inconvenience, and the quantity of water which had accumulated was not considerable. Under a soothing treatment, with slight counter-irritation over the region of the bladder, this paralytic state gave way within four-and-twenty hours, but it was several days before the full power and tone of the bladder were restored. Under a regimen directed to oppose the gouty tendency, and the frequent free use of the Vichy water, this patient has continued quite free from any symptom of gout for many years.

4th. Gout attacks the bladder, in some cases, in the following manner (and I take my remarks on this head from a case which actually came under my observation):—A gouty man indulges more freely in the delicacies of the table than he is usually wont to do; perhaps he is guilty of some

indiscretion in what he partakes of, eating cheese or some other indigestible matter which disagrees with him. Before he goes to bed, he is suddenly seized with violent pain in the region of the bladder, which in some cases lasts an hour, but in others continues to torment the patient for a much longer time, preventing him from sleeping, and often producing great distress. This condition is usually relieved by free counter-irritation, the administration of alkalies, and the cautious use of opiates.

If, then, you find a man labouring under any of the four conditions of vesical affection that I have described, and at the same time you are able to discover from his history, symptoms characteristic of an acute or chronic gouty state, and you are convinced of the absence of calculus, you may conclude that the symptoms are dependent upon a gouty affection of the bladder, and your treatment should be influenced accordingly. It must, however, be borne in mind, that a stone will cause the development of very similar symptoms, and it will, therefore, sometimes be necessary to sound the patient carefully, in order to determine the presence or absence of stone. The sudden invasion, the existence of the gouty diathesis, and the absence of other causes to account for the symptoms present, mark the peculiar nature of the affection, and concur in making us suppose the disease to be of gouty nature.

Being decided as to the diagnosis, what means are we to adopt to relieve the symptoms? The treatment in these cases is obvious and simple. First and most important is free counter-irritation; but you must apply your counter-irritation carefully, and consider what form of counter-irritant will be best suited to the case. Blisters would be improper, because cantharidine, which is the active principle of the blistering-plaister, is a direct irritant to the mucous membrane of the bladder, and would, therefore, tend rather to increase than to diminish the distress. Neither must turpentine be employed, because it irritates the kidneys, and this irritation is liable to be propagated to the bladder. Mustard is the most effectual counter-irritant which we can use in these cases, and has not the disadvantages of the former remedies. Strong ammonia may likewise be used as a counter-irritant. Our next consideration should be to assuage pain, which in many instances is a most urgent symptom; and this we should endeavour to do in the speediest and safest manner possible. Of whatever form the affection may be, the best plan is to give opium. This may be done by the endermic method, by rubbing in a strong opiate liniment over the region of the bladder. Or, as is much better and more certain in its action, the opium may be given in the form of an enema injected into the rectum. About half a drachm of laudanum, mixed with a small

quantity of decoction of starch, of which not more than an ounce and a-half, or two ounces, should be employed, may be gently injected into the rectum. This you will find will act as a sort of warm opiate poultice to the bladder; in this way all kinds of irritability of this organ may be relieved. The irritable state of the bladder caused by cantharidine (strangury) is effectually relieved in the same way, and gouty inflammation is benefited in like manner. The action of cantharidine, indeed, forms a pretty illustration of the manner in which we may suppose the gouty poison to cause the vesical irritability. And both strangury and vesical gout may be treated in a similar manner. If the patient be not quite relieved after the administration of the first enema, you need not be afraid to give a second, provided you are sure he exhibits no peculiar idiosyncrasy with respect to opium. In many cases of this kind you may give opium also with advantage by the mouth, and especially in combination with sudorifics.

With reference to the treatment of all cases of gout, where the disease is apt to attack internal organs, I will give you this practical hint, and let me strongly advise you to bear it in mind, whenever you may be called upon to treat gout of this nature. It is this, that these cases are of an asthenic character, and do not bear depletory measures; so that, if you find a patient labouring under gout of

the stomach, or gout affecting the bladder, you must not think of applying leeches, and employing the treatment which would be applicable to other forms of inflammation of these organs; for the abstraction even of so small a quantity of blood as would be taken by the application of a few leeches might do the patient serious mischief, and cause prostration from which he might never rally. On this point Sir Benjamin Brodie has expressed a similar opinion; for he lays it down, that antiphlogistic treatment is inapplicable to that particular form of inflammation of the bladder which is of gouty origin. With regard to the exhibition of colchicum, I am of opinion, that, in many cases, it is inadmissible, and, in all, it should be given with great caution and circumspection; for this so-called specific is certainly very depressing in its action, and therefore unsuitable to cases which partake of the asthenic character.

The treatment which, in my experience, has been most beneficial for gout, when it attacks any of the hollow viscera, consists in employing free counter-irritation, keeping up a moderate action of the bowels, paying attention to the functions of the skin, and promoting the action of this great secreting surface by the exhibition of sudorifics. Provided the urine be not alkaline, the administration of alkalies will be found of service, and opium may be employed with great advantage for allaying that irritability of the affected organ,

which is often productive of great distress to the patient.

As I have before hinted, there is much resemblance between the gouty affections of the bladder and those of the stomach. In the latter organ, gout shows itself by the sudden development of violent pain referred to the epigastric region. This is always attended with the generation of gas in large quantity, which distends the organ, and it is this great distension which chiefly, if not solely, causes the pain. Another form is that in which the stomach becomes impatient of the smallest quantity of food, as the bladder is of urine. Incessant vomiting is the characteristic symptom of this form of the complaint. Sometimes these symptoms exist together, as you have lately witnessed in the case of Pyne, in the Sutherland ward.* In other instances, the muscular coat of the stomach becomes greatly weakened, and the food is pushed on only very slowly into the bowel. It accumulates in and distends the stomach, which gradually becomes dilated and large, and by reason of the atonic state of the organ remains so. In all the forms of the complaint, but in none more than in this last, the tendency to the generation of a large quantity of gas is a very prominent feature.

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* *Vide* Lect. XVI. p. 419.

And now, to return from this long digression, into which I have been tempted by the interest of the subject, to the cases in which pus appears in the urine.

Case XLVIII.—Our second case is particularly interesting, by reason of the large quantity of pus in the urine. The patient is in Lonsdale ward; her name is Mary Anne Jenkins; she is unmarried, and only twenty-five years of age. We have good notes of the case kept by my clinical clerk, Mr. J. H. Sylvester.

This patient has been for a long time passing large quantities of pus in her urine. She was herself able to detect the pus so long ago as twelve months before her admission into the hospital, but it is probable it may have existed long before she discovered it; and she informs us that, ever since, she has passed a considerable quantity each day without intermission.

All the history that can be obtained is as follows:—For the last five years she has suffered constant pain in the loins, referred especially to the region of the left kidney. This pain varied in intensity; it was generally slight and dull, but now and then severe. It does not appear, however, that at any time she suffered so much as to oblige her to desist from her usual daily occupation—that of a household servant. There have not been any symptoms of an acute attack, nor any rigors or vomiting. She never, to her know-

ledge, voided blood in her urine, nor did she ever pass gravel or a calculus; nor does she seem to have ever suffered from severe pain in the direction of the ureter. We could trace no evidence of local injury, and she never remembers having had any severe blow in the loins.

Rather more than twelve months before her admission into the hospital she was suddenly attacked with retention of urine, which lasted twenty-four hours; and immediately after its cessation she first began to notice in the urine a sediment, which presented the same characters as that which is now constantly deposited. This attack of retention of urine was preceded by slight rigors, but the constitutional disturbance was altogether of so mild a character as not to cause her to lie up at all. We could not trace the history of any inflammatory attack affecting the kidneys themselves; nor could we discover any sign denoting the existence of any peculiar diathesis.

On her admission we found that the urine deposited a large amount of pus, which was estimated daily by pouring a certain quantity of the urine into a graduated measure, and allowing the pus to subside. In this way we found as much as two, three, and even four ounces of pus deposited from the urine of twenty-four hours. It is very remarkable that all this secretion of pus produced so little constitutional disturbance, that she was, from

its first appearance, never even once prevented from continuing her duties as a domestic servant. So trifling were the constitutional symptoms, that she did not seek for medical assistance until she observed a large quantity of pus in the urine, when she consulted her master, a medical man, who soon afterwards sent her to see me.

Upon a careful examination, I found a very large tumour situated in the region of the left kidney, and forming a considerable projection beneath the abdominal wall. This tumour, which was three times the ordinary bulk of the kidney, was elastic and yielding to the touch, and communicated the sensation of a soft elastic swelling filled with fluid, rather than that of a solid mass. There was dulness on percussion all over the surface of the tumour; the dulness, however, did not extend up to the left hypochondriac region, neither in front nor behind in the vicinity of the spleen. The surface of the tumour was smooth and round, and free from any notches or projections.

The diagnosis of a tumour, such as I have described, is, perhaps, less complicated when it is found on the right than if it occur, as in this case, on the left side. In this latter situation it is liable to be confounded with an enlarged spleen, which is by far the most common tumour found in this situation. How, then, are we to distinguish the one tumour from the other? A splenic tumour enlarges first upwards, so as to occupy the whole of

the left hypochondrium, the posterior and lateral portions of which would yield a dull sound on percussion, the stomach being pushed by it to the right side. It then increases downwards and somewhat forwards, presenting its anterior border forwards and towards the right side, which, in thin persons and children, may be readily felt and even grasped, and in which may frequently be found one or more notches, which are very characteristic of an enlarged spleen. A kidney will not enlarge in the upward direction so as to possess itself of the left hypochondrium; it extends chiefly downwards and outwards, and presents to the hand, behind the anterior abdominal wall, a broad convex surface, causing more or less bulging of the loin posteriorly. When the subject is thin, you may seize the tumour by placing your hand on the loin, and your thumb on the anterior wall of the belly, and you may thus lift it, and form some idea of its weight.

The splenic tumour is firm and solid, smooth and convex on its outer and anterior surface, with its anterior border, as I have already said, thick, prominent, and notched. No such edge can be felt in the renal tumour; and in character it may be solid or elastic, or even fluctuating, according to the nature and cause of the enlargement.

Then it is hardly necessary to point out to you that you must call to your aid in the diagnosis certain concomitant symptoms such as the pecu-

liar sallow complexion, and, in all probability, some history of previous or actual ague, in splenic cases, and the presence of renal symptoms when the kidney is the organ affected. Indeed, the constitutional symptoms which often accompany suppurative disease of the kidney, the rigors, and sweats, simulate ague so nearly as to be very apt to mislead even the most vigilant observer.

The tumour, in the present case, was not painful; the patient could bear it to be handled without pain, unless hard pressure were used, when she complained of a dull pain. Her most urgent symptom was an occasional cutting pain, referred to the neck of the bladder, sometimes accompanied with slight difficulty of micturition. She stated that occasionally she had a sensation of fulness in the left side, which would go off rapidly, as if something had burst, and then there would very soon follow an increased flow of pus in the urine. There is good reason to believe that pus itself may irritate the mucous membrane of the bladder when it passes over it; and it was probably on this account that our patient always complained of a cutting pain in the region of the bladder whenever she passed an increased quantity of pus.

The pulse, in this case, never rose above 96. Now and then our patient perspired slightly, but never profusely; and, as I said before, there has been much less constitutional disturbance than we might fairly expect to be present, when we

consider the amount of lesion that must exist to account for the enormous quantity of pus that this patient passes.

The largest quantity of pus that we have found in a pint of urine is four ounces and a-half, and in no instance have we obtained less than an ounce and three-quarters from the same quantity; so that if the patient passed two pints of urine, the enormous amount of eight ounces of pus would have been often excreted in the twenty-four hours. Generally, however, the quantity of urine passed fell below the normal standard, and often did not exceed twelve ounces.

Such, then, is the history of this very remarkable case, which is especially interesting in a clinical point of view from the co-existence of the tumour with the daily passing of so much pus in the urine.

Assuming, for the reasons which I have already specified, that the tumour is due to an enlargement of the kidney, we must next determine the source of the pus. Did it come from the bladder, or did it result from irritation of the mucous membrane of the pelvis of the kidney or ureter, by the presence of a calculus, or from any other cause? It evidently did not come from the bladder, for so large a quantity of pus could scarcely be secreted from the mucous membrane of this viscus, without extensive disease of the bladder itself; in which case, we

should have expected to find a greater disturbance of the general health, and more decided symptoms referable to the bladder. A circumstance worthy of notice, in this case, is the absence of triple phosphate. I alluded to this in my last lecture, and also to the fact of that salt existing in considerable quantity in a case of inflammation of the mucous membrane of the bladder. In the present case, the urine has been frequently and carefully examined at short intervals, but we have never been able to detect any crystals of the triple phosphate.

Did the pus come from the ureter? I think not, because symptoms are wanting to denote irritation of that duct, and also because the ureter does not afford a sufficient extent of surface to secrete so large a quantity of pus. The diagnosis, then, becomes limited either to abscess of the kidney, or to that condition of the mucous membrane of the pelvis of the kidney, to which the term "pyelitis" has been applied by Rayer. *Primâ facie,* it seems difficult to conceive how the latter affection could create a large tumour in the region of the kidney; but I think this admits of explanation.

Let me now, by simply stating my view of the case, endeavour to account for the presence of the pus in the urine, and to explain the nature of the tumour in the side. From some cause or other—probably from inflammation of the ureter—a certain amount of contraction of that duct oc-

curred some time ago, the seat of the constriction being, probably, very near the bladder. Let us suppose a stricture formed in this situation, and consider for a moment the phenomena to which it would give rise. Fluid would, of course, accumulate above the point of stricture; and as the quantity of urine increased, it would exert a backward pressure up the ureter towards the kidney, the effect of which would be, first, to dilate the ureter; next, the pelvis of the kidney would suffer; and, lastly, the kidney itself would gradually become expanded into a large cyst, with a thick wall, in which all the elements of the secreting structure would be retained. Of such a change we had a good instance, in its early stage, in the case of Steventon, in Sutherland ward, (vol. xxxiv. p. 13,) in whom we made the diagnosis, during life, of the existence of a calculus in the ureter. You will remember, that at the examination of the body a calculus of the size of a good large nut was found impacted in the lower part of the left ureter; and you saw a marked dilatation of the ureter above the impacted calculus. The pelvis of the kidney was much dilated, and the calices or infundibula which embrace the papillæ were also considerably enlarged. These papillæ themselves were flattened and compressed, and the substance of the kidney spread out so as to present an apparent enlargement of the gland, to the extent of nearly a fourth of its normal size.

Now, although, in Jenkins' case, we have no evidence of the impaction of a calculus in the ureter, there may be some obstruction in that tube; and the same series of changes which I have described in Steventon's case have been taking place probably over a much longer space of time, and to a much greater extent. The kidney has become expanded into an immense thick-walled sac, and much dilated; and ultimately it has attained the size which it now possesses, occupying the space between the last ribs and the crest of the ileum. In this way we get an immense surface, capable of generating a vast quantity of pus—in fact, a pus-secreting surface. This is the way in which I think the presence of the pus in the urine, and the existence of the large tumour in the side, may be accounted for. The stricture causes a backward pressure on the kidney, which becomes sacculated in consequence, and the healthy function of the mucous membrane becomes impaired, and at length transformed into a pus-forming surface.

Case XLIX.—Many years ago I examined, for the late Mr. Guthrie, the body of a patient who died from the long continuance of disease of the kidney of this kind. There was an enormous tumour of the right kidney, which resulted from the expansion of the organ in the manner I have described into a large sac filled chiefly with pus. Imperfect septa projected into the sac, cor-

responding to the dilated infundibula. The ureter was nearly as large as a portion of the small intestine, and there was a stricture of it about a couple of inches above its entrance into the bladder, caused by a thickening of the walls of the duct.

Case L.—Some eight or nine years ago, I had an opportunity of seeing another case which I have no doubt was of a similar nature to this. I was requested to see a gentleman, a young man, who was suffering from a large and painful tumour in the left side. He had seen several physicians, and there was some difference of opinion as to the nature of the tumour. Upon a careful examination, I came to the conclusion that the tumour was due to a sacculated condition of the kidney. I was very much aided in this conclusion from having examined *post mortem* the last case I mentioned. With this view of the case, and believing that the pain arose from the pus being pent up in the huge sac of the kidney, I recommended that the patient should get up, and be kept moving about as much as his strength would permit, assuming that gravitation would favour the descent of the contents of the sac; and this plan was apparently successful, for, very soon after he commenced walking about, much glairy matter appeared in the urine, and, in a few hours more, he passed a large quantity of pus. This gentleman ultimately got quite well, and the tumour in the side gradually subsided. In this case, I was able to

obtain the following explanation of the formation of the tumour:—The patient had formed a great notion of the powers of nitre in the treatment of colds, and he was in the habit of taking this substance in very large quantities. These large doses of nitre at last irritated the kidneys very much; and, inasmuch as there had been probably a stricture of the left ureter, the increased secretion of urine was prevented from flowing freely into the bladder; hence a backward pressure was exerted; distension of the ureter, and ultimately of the pelvis of the kidney occurred, leading to the formation of pus, as I just now described.

In support of this view of the case, I may state that although this patient got quite well from the first attack, I was informed that he was imprudent enough to have recourse to nitre again some time afterwards, and that his doing so was followed by the same train of symptoms as before, by the formation of a tumour, which disappeared in the same manner as on the first occasion.

Let me add a further illustration of the mode of formation of sacculated kidney from a cause within the bladder.

Case LI.—James Ash, æt. 49 (vol. xlvi. p. 102), was admitted into the hospital in August, 1855. He was suffering from pain referred to the neck of the bladder, and great frequency of micturition. For seven years he had been the subject of this latter symptom, which had very

much increased of late. It was attributed by him to a severe gonorrhœa which he contracted many years ago. He would pass water with pain and scalding. The urine was very turbid, containing a considerable quantity of pus, and often blood, which came away in clots; it was slightly alkaline, of specific gravity 1006, and contained much albumen. The bladder was examined without detecting a stone; rigors followed the passing of the catheter.

Under the influence of large doses of the tincture of the sesquichloride of iron, nitric acid, and tincture of hyoscyamus, his symptoms were mitigated for a time. One or two attempts were made to wash out the bladder, but they occasioned increased irritation and a discharge of blood.

He frequently complained of great and constant pain at the end of the penis. The irritability of the bladder now became so great as to induce incontinence. He had sleepless nights, and his powers failed more rapidly than could be explained on the supposition of irritation from calculus or by the amount of discharge.

The urine now became constantly bloody, and a considerable quantity of blood was lost in this way. On the 16th of September he sank rather suddenly.

On examining the body, the right ureter was found very much dilated; the left was also dilated, but by no means to the same degree. The right

kidney had a lobulated appearance externally; on being opened it was found to contain a large quantity of a purulent fluid, all the gland-tissue was compressed into a thin wall to the large cyst which contained the pus, and imperfect septa from the inner surface projected into the cavity. The left kidney was in a similar condition, although to a much less degree, and the comparison of the two organs illustrated very strikingly the gradual expansion of the solid gland into a hollow cyst, by the backward pressure of the fluid excreted from it, but encountering an obstacle to its free discharge. The nature of this obstacle was found on opening the bladder. The walls of this organ were very much thickened; in its interior a large mass of open cancer was discovered, occupying the inferior fundus and part of the posterior wall. It involved the opening of the right ureter, which was evidently obstructed by it, and the obstruction was increased by a considerable thickening of the wall of the ureter, and a consequent narrowing of its canal. The patch of cancer was hard, thick, and considerably raised above the surrounding wall of the bladder. The orifice of the left ureter was also narrowed, and obstructed by the thickened vesical wall.

Would not abscess of the kidney explain the phenomena occurring in our patient Jenkins? The existence of abscess implies the occurrence of sup-

purative inflammation of the kidney, followed by the process of sloughing, and the formation of more or less pus in the cavity left by the evacuation of the slough. Such changes as these could hardly take place to such an extent as to give rise to the secretion of so large a quantity of pus, without causing considerable constitutional disturbance, much more than has existed in this patient.

The amount of constitutional disturbance in cases of this nature varies with the extent to which the gland is affected. A very small abscess may exist without much fever; but this cannot be the case where the abscess is large, or, as frequently happens, where there are several abscesses.

Not long ago, we had in the hospital a patient who exhibited the symptoms of renal abscess in their most aggravated form. Many of you may remember the case to which I allude—that of Walter Denny, in Sutherland ward, the notes of which were kept by Dr. Edward Simpson.* This patient had been suffering for seven years prior to his admission, from frequent attacks of severe pain, accompanied with vomiting and hiccough, and irritability of the bladder. The attacks, which he was told, and not unreasonably, were due to the irritation of a calculus, subsided on his going into the country, and he remained well for four

* See the full details of this case at p. 44, Case VIII.

years. At the end of this time, they came on again with great severity; he had frequent rigors, and the pain was so extreme that chloroform was administered to him on more than one occasion. Under this illness he was for eighteen weeks in a hospital in London. On leaving that hospital, he had a remission of his sufferings for some months, from May, 1849, to July, 1850; the right loin, however, remaining tender. He came into this hospital on the 9th of August, with a fresh attack, and during his stay here, he suffered from paroxysms of pain, vomiting, and hiccough, which were always accompanied with a free discharge of pus. Then the purulent discharge would cease; and then would come a remission of the symptoms, to be followed by a fresh discharge, and renewed pain, vomiting, and hiccough.

This alternate appearance and disappearance of pus in the urine, coinciding with the development and subsidence of the symptoms, led me to think that there was an abscess in the kidney, which, on becoming full, excited great pain and constitutional disturbance, until it had freely discharged itself, or that a new process of sloughing was taking place, and a new abscess being formed. Whether or not at the root of all this mischief there was a calculus, one could not positively say. It was somewhat against this view that no blood had been passed, and that no small calculi had ever been discovered in his urine; but, on the other hand, it was greatly

favoured by the excessive pain, the sickness, the vomiting, and the hiccough.

This patient died exhausted by his sufferings, and we found in the right kidney a small abscess, with an inflammatory state of the ureter, the mucous membrane of which was covered with a thick layer of lymph in its whole tract. The bladder was healthy.

Case LII.—The case of Sarah Furnace, aged 29 (vol. xxxi., B), a married woman, who was some weeks in the hospital, will exemplify the milder form of abscess in the kidney,—that is, when the constitutional symptoms are less severe.

The symptoms, in this case, began two years before her admission, with pain in the left side of a sharp kind, loss of appetite, and fever. Soon after this, she felt a tumour in that side, and then she observed blood and matter in her urine. From this time the tumour was found to enlarge gradually, and become painful; she then had a sensation as if it burst, and the discharge passed off in the urine.

And during her stay in the hospital this was what seemed to take place. On her admission, we could detect a decided enlargement of the left kidney; then she had the sensation of bursting, and with it relief to the pain and a free discharge of pus. Then the pus would disappear from the urine, until a fresh accumulation took place; the kidney would again enlarge and become painful,

and again empty itself as before. While the kidney was thus full and painful, the febrile symptoms would be at their height, and then they would subside as the pus flowed away.

This patient did not remain more than a fortnight in the hospital; but, even in that short time, under rest, good diet, and a little quinine, her general health considerably improved.

Let me mention another case, where the abscesses were more numerous and the symptoms more severe.

Case LIII.—Anne Kirton, æt. 37 (vols. xxxiv. p. 269, and xxxvi. p. 44). The symptoms in this case began twelve months before admission by incontinence of urine, apparently from great irritability of the bladder. This symptom continued without any fresh one (to her knowledge) from February, 1851, to November of the same year. One day in this month, after travelling in a railway carriage, she noticed that her water became very thick and red. This lasted a week, and she then began to pass urine of a yellow colour, with an abundant sediment of pus.

On examining her, a large tumour was found in the right flank. Its upper extremity appeared to touch the liver, and its lower extended down to the right iliac fossa. It was convex, elastic, almost fluctuating, and communicated very much the feeling of an hydatid cyst. Large quantities of pus were almost constantly passed in the urine,

in which there was little or no triple phosphate. The tumour was painful under pressure. The size of the liver could be distinctly marked out, and isolated from the tumour, the upper portion of which it overlapped. She suffered great pain in the region of the kidney and down the ureter. This woman remained many weeks in the hospital, and went out without any change of symptoms, and died two months subsequently.

The right kidney was enormously enlarged, and several abscesses were excavated in it; the pelvis was thickened.

To return to the case of Jenkins; we tried various plans of treatment, chiefly with a view to improve her general health. She took, for some time, bark and mineral acids. We tried, likewise, gallic acid, hoping it might affect the quantity of pus; but, although her general health improved, no material diminution of the pus took place, nor did any change in her symptoms occur.

The prognosis in the case of Jenkins need not be unfavourable; the disposition to form pus may cease, and the sacculated kidney shrivel up; the long-continued pressure on the vessels and tubes of the kidney enclosed in the wall of the sac may destroy the secreting power of the organ, while the other kidney may take on itself the work of both. The pus being evacuated, and no fresh pus secreted, both the sac and the ureter may shrink up. This,

as Sir B. Brodie has suggested, is the probable explanation of the shrivelled kidney and ureter, which is sometimes met with; the other kidney being large and plump. This young woman's constitution being good, and there being a free exit for the pus, we may hope that she will yet do well, as in the case I have already related.*

But were this a case of abscess in the substance of the kidney, our prognosis would be very different. Such cases are in general fatal after a longer or shorter time, according to the severity of the symptoms and the natural power of the patient; and in dealing with them, you must be above all things careful to uphold your patient's strength, and to caution him against everything that can weaken or exhaust it. But this must be done with due regard to the power of his digestive organs, and great care taken not to disturb or derange them. There is quite sufficient reason to suppose that a small abscess may get well, or

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* Eighteen months after this lecture was delivered, this patient presented herself at the hospital and gave the following history. On quitting the hospital, she went to Brighton, and there improved in health very much, and the purulent discharge gradually diminished. On a careful examination of the side, there was no trace of the tumour. A few pus-globules were seen in the only specimen of the urine which was examined; but whether these came from the kidney, or merely from the vagina, could not be decided.

remain quiescent for many years. I am sure I know persons now living and enjoying good health who have, or have had a cyst in the kidney, from which pus has been secreted.

I have now directed your attention to the cases most likely to come before you, in which a large quantity of pus appears in the urine. They may be classified thus:—

1. Cases of affection of the bladder in which the pus is secreted by its mucous membrane, as in simple cystitis, or in that caused by retained urine, or by the presence of a stone, or by some constitutional cause, as gout.

2. Cases in which the pus is secreted by the mucous membrane of the pelvis and infundibula of the kidney,—cases of pyelitis.

3. Cases in which the pus comes from the substance of the kidney itself, in consequence of the existence of abscess. To these may be added, cases in which pus comes from the ureter; but this is an affection seldom isolated from pyelitis, or from inflammation of the mucous membrane of the bladder.

LECTURE XV.

On Gout.

GENTLEMEN,—We have at present two interesting cases of gout under treatment in the hospital, which will furnish material for some remarks on that disease. One is a case of gout in a very common form, and which well represents the usual course of an attack; the other exhibits the disease in a very aggravated and serious aspect; and both afford good illustrations of the most interesting points in the clinical history and pathology of the malady.

CASE LIV.—Of the former of these cases I shall speak to-day. We have a good record of it by Mr. William Browne, my clinical clerk.* It is that of William Fountain, æt. 54 (vol. xxxi., A, p. 142), a baker by trade, who, although not very intemperate, has been in the habit of taking his full allowance of fermented liquor in his time; he admitted that he lives well, and that he usually drinks two or three quarts of porter a day, to say nothing of a little gin. I refer particularly to this feature in his history, because

* Now of Lichfield.

I have no doubt that it is to this habit of drinking beer freely that he owes his gout. Most persons who indulge much in beer or porter suffer sooner or later from this disease. Malt liquor is *par excellence* the pabulum of gout, for two reasons—because its chemical composition is favourable to the formation of uric acid, or some compound very closely allied to uric acid; and also because people, who are fond of beer, generally drink it in large and unmeasured quantities at their meals, and between their meals, and by taking it freely with other food they derange the primary assimilation, and thus damage all those secondary processes concerned in nutrition. This explains why it is that we meet with so much more of this disease in the English hospitals than in those of other countries.

In England malt liquors are in common use among all classes of the population, high and low; they are drunk very largely by the labouring classes, especially by those of large towns, and in particular by those whose work is laborious and trying to the constitution, and who on that account receive good wages, and therefore can afford to supply the waste caused by their great exertions by means of liberal potations of a fluid at once stimulant and nutritious like beer. Hence it is that we very commonly find coalheavers, bakers (like our patient Fountain), brewers' draymen, house-painters, and others of the working classes,

inmates of the London hospitals, suffering under gout in its various forms. There is another class also who can scarcely be said to *labour*, who are sometimes admitted for this malady; namely, butlers or house-servants of wealthy families, and coachmen.

It is remarkable that in Ireland and Scotland gout is a disease almost entirely confined to the better classes of society, and that it is rarely, if ever, seen in hospital practice. This is because beer is but little used by the lower orders in those countries. In such towns as Dublin and Edinburgh there must be a large portion of the working classes well paid, and therefore well fed; but porridge, potatoes, fish, and bread, are the chief sources of their sustenance, meat less frequently, while whisky is their stimulant; and these kinds of food do not generate gout unless taken in large quantities, and in habits already tainted with the disease by inheritance.

For the same reason, in France and Germany (excepting in the beer-producing Bavaria), gout is by no means common; and the meagre accounts to be found of this disease in foreign works plainly show that the authors cannot have had much practical acquaintance with its characters.

I need not remind you that gout is one of those maladies which are pre-eminently hereditary; that a son will inherit it from his father or mother, and, what is more curious, from his grandfather or grandmother, the intervening generation

being free, or nearly so. Such *inherited* gout is frequently most obstinate and difficult to eradicate, the gouty diathesis being more fully developed than when it has simply been acquired. It is, therefore, well to inquire into this point in the history of such patients as come before you. In the present instance, fortunately for the curability of the disease, and unfortunately for the *respectability* of our patient's gout, we cannot make out any pedigree,—it appears to owe its origin to that ignoble source, *beer*.

Fountain's first attack of gout came on ten years ago — that is to say, it did not develop itself in any paroxysm until that time, although he had often suffered from flying pains about the joints, indicating the development of the gouty diathesis,—so that he had reached the age of forty-four years before he had his first attack. This first attack came on suddenly: having gone to bed well, he was awoke in the middle of the night with violent pain in the right great toe, followed in a few hours by redness and swelling; from this he recovered in a few days, and his second attack did not occur for another year; this was more severe than the first, and affected the foot as well as the toe. His present attack came on about five days before his admission; the patient having suffered from headache, giddiness, and nausea, for a few days previously.

This history is highly deserving your atten-

tion. It is just that which we get in a large proportion of the cases of gout,—the patient being, in point of age, about or beyond the meridian of forty, and accustomed to the daily use of beer to a greater or less extent, without anything of what might be called excess, but habitually taking a regular quantum of malt liquor. Under these circumstances a man becomes dyspeptic; as he advances in years he becomes less active in his habits of exercise; he suffers, perhaps, from headache and from flatulence, and the bowels act irregularly; his complexion acquires a sallow hue, there is yellowness of the conjunctivæ, and at the same time the urine is not secreted in its usual quantity; it becomes high-coloured, and prone to precipitate uric acid or urates. With all this there may or may not be a little local uneasiness, a little stiffness or discomfort about the great toe or instep, hardly amounting to pain, which perhaps the patient may disregard at the time, but still sufficient to attract his attention to the part.

A patient suffering under these symptoms is undoubtedly, in most instances, if he be a man of gouty habit, or if he inherit the disease, threatened with an attack of gout; yet, if you tell him so, he will not believe you,—perhaps he will laugh at the idea that *he* is to have the gout; but in the course of the night, or towards morning, he awakes up suddenly, suffering from violent pain in the great toe or some other part

of the foot. At first there is no redness whatever,—merely pain, which soon becomes accompanied with a sensation of throbbing and enlargement about the joint; the pain becomes more severe, so that the patient dreads even the contact of the bed-clothes. This continues for some hours, or even for some days; then the acute pain diminishes, the redness and swelling subside, but the joint remains stiff for some time, in consequence of the thickening of the tendons and ligaments about it. This thickening is caused by a deposit in the fibrous structures about the joint, probably consisting of urate of soda, the same salt as that which enters into the composition of chalk-stones, with perhaps, also, some phosphate and carbonate of lime. The more frequent the attacks of gout, the more the joint suffers; because each succeeding attack leaves a little deposit. The joints appear large and stiff, and the cartilage, as well as the ligaments, and of course the synovial membrane, undergo a change in structure. In certain cases, a thin layer of urate of soda, looking very much like a layer of plaster of Paris smeared over the cartilage, may be observed.

An interval of nine years elapsed between our patient's first and second attack—a very remarkable circumstance, as in general, after the first invasion, the attacks recur once or even twice annually, generally in spring or autumn. This second attack took place only twelve months ago.

Like the first, it was characterised by a sudden invasion of pain in the great toe and side of the foot, the patient having previously suffered from headache and a feeling of nausea for some few days. The present attack came on only a few days before his admission.

Now you may fairly ask, why do you call these attacks gout, and not rheumatism? Rheumatism attacks joints, and causes swelling and great pain: how are we to distinguish between the rheumatic and the gouty attack? The points which would lead you in this case to the conclusion that the disease is gout, are these:—The age of the patient—his diathesis—his habitual use of malt liquor—the rapid or sudden way in which the attacks came on—and the fact that the parts first affected were the small joints, and especially that these were the metatarso-phalangeal joint of the great toe, and the tarsal joints, which are pre-eminently the favourite habitat of gout. Rheumatism is a disease which, generally speaking, affects early life; while gout is usually met with in persons of middle or advanced age. The chances of acute rheumatic affections are very much diminished after the age of forty; while gout most frequently occurs at and after this age.

This patient had none of those very profuse sour-smelling sweats so frequently met with in rheumatic fever, and which are highly characteristic of that disease. You may, perhaps, have noticed

a girl in Augusta ward suffering from this malady; and although only two joints are affected, and those very slightly, yet she has this profuse sweating as a most prominent symptom. This tendency to sweating is never altogether absent in rheumatic fever; it is a more essential feature of this disease than the articular affection. It is not uncommon, indeed, to meet with instances of fever with profuse sweating and furred tongue, just as in rheumatic fever, without any articular affection, but perhaps with inflammation of some internal organ. In this way pneumonia and pleurisy, but more commonly the former, often show themselves. The symptoms are fever, with a full bounding pulse, and a furred tongue, copious sweats, pneumonia or pleurisy, or both: and there may or may not be articular affection; sometimes the joints do not become affected till towards the end of the fever. In cases of gout, more especially when the gout is pretty general, and affects large joints as well as small—the *rheumatic gout* of some authors, and the *synovial rheumatism* of others—you may have sweats, but rarely the very profuse sweats of the true rheumatic fever.

I have referred to the suddenness of the invasion as characteristic of gout. This is a very remarkable feature of this remarkable disease. The invasion is, no doubt, in nearly every instance, to all intents and purposes, sudden to the patient; but, on a careful analysis of many of the cases, it will

be found to be more apparent than real, and to arise from an extremely rapid development of a disease which had been insidiously creeping on for a longer or shorter time before. On close inquiry, circumstances will be brought to the patient's recollection tending to show that some disturbance of his system, or of one or more of his joints, may have previously existed. Practically, however, the invasion is sudden: a man goes to bed thinking himself well; he had been walking about for a great part of the previous day; in the middle of the night, or in the early morning, he wakes up with the severe pain of an attack of gout. Now this does not occur in articular rheumatism: never, so far as I know, does the rheumatic attack come on otherwise than gradually—first in one or two joints,—those of the lower limbs generally,—then in those of the upper extremities.

And it is not an unimportant diagnostic guide to observe which are the joints first affected. In gout, in the vast majority of instances, those first visited are the great toe or the instep, or some other *small* joint. In rheumatism the ankles and knees are generally the first attacked. It is certainly one of the most striking distinguishing characters between gout and rheumatism, that the former fixes upon the small joints, the latter upon the large. But no practical man would allow that either may lay claim to the one or the other class of articulations as its exclusive habitat: what is not inaptly

called *rheumatic gout*—but which, I think, may be more correctly designated *general gout*—attacks all the joints, even to those of the lower jaw. And so also in rheumatism, even in rheumatic fever, all the joints may be attacked, even to those between the articular processes of the vertebræ. Thus it is that Nature, even in her abnormities, throws difficulties in the way of our attempts at classification and definition, just as she does with reference to the objects of study of the zoologist or botanist.

But it is to be feared that some of you will say, what a difficult matter it must be to decide what is gout, and what is rheumatism! I think, however, I can promise you that you will not make this remark when you have really studied and watched many of the cases. You will then see that the mode of invasion, the age of the patient, the absence or presence of profuse sweats, the history of previous attacks, and especially of the first, will generally serve as useful guides to lead you to a satisfactory diagnosis.

Dr. Garrod has made out a positive physical character of gout, which may be regarded as surely diagnostic of that disease from rheumatism. It consists in the discovery of uric acid in the blood-serum or the blister-serum. And his process is ingenious, and so simple that any one may use the test, however little accustomed to chemical manipulation. A little serum is put into a watch

glass, and to it are added five or ten drops of acetic acid. In this acidulated serum a small skein of worsted is laid, and the watch glass is set aside under cover to protect it from dust. After a few hours, the crystals of lithic acid, if it exist, will be found adhering to the threads.

There is one feature of difference between the two diseases, of very great interest as regards both diagnosis and prognosis, upon which I have not yet touched: I allude to the liability in each to affection of the heart. This liability is greater and much more serious in rheumatism than in gout. In rheumatic fever you frequently have, as you well know, most exquisite examples of both pericarditis and endocarditis, so that a fearfully large proportion of the cases emerge from the fever with a damaged heart, in the form of an adherent pericardium, or an imperfect mitral valve, or both. In gout, these acute affections are among the rarest occurrences; yet, that the heart is liable to be *slowly* damaged, both in its muscular structure and in its fibrous tissue, all experience proves; and the well-known fact of the liability to irregularities in the heart's rhythm, which is so common with gouty patients, shows a marked proneness to cardiac complications in gout. What seems to me to be the prominent distinction between the cardiac affections of the two diseases is this—that in rheumatism there is a proneness to fibrinous concretions on the pericardium or the endocardium; in gout, the nutrition

of the muscular structure suffers, and inorganic deposits (urate of soda, and phosphate and carbonate of lime) take place in the chordæ tendineæ and other parts of the fibrous tissue of the heart, which stiffen them, and cause them to shrink, and ultimately impair the efficiency of the valvular apparatus.

In both rheumatism and gout a tendency of the disease to shift from one place to another has long been recognised by practitioners; and hence the cardiac inflammations of rheumatic fever used to be regarded as examples of *metastasis* from external to internal parts. This tendency to shift is most signally noticed in rheumatic fever, when particular joints seem to be invaded in succession by the rheumatic state; and then, indeed, there is much the appearance of a true metastasis,—to-day, for example, the left knee is affected, to-morrow the right knee, while the left knee has become quite or nearly well. But there is no metastasis in the cardiac affection, for the external rheumatism may remain unchanged, or may even become more severe, while the heart-disease is at its height; and not unfrequently the cardiac disease comes on first, and the articular affection subsequently.

In gout there is, on the whole, less tendency than in rheumatic fever for the disease to shift *from one joint to another joint;* but in this disease we have the most remarkable examples of true

metastasis from an external to an internal part, or *vice versâ*. A patient may have had at your visit yesterday well-marked gout in his instep, and at your visit to-day you find the instep nearly well, but he is suffering exquisite pain in the stomach. Or the disease may first show itself in some internal organ, and then attack one or more joints. Thus a gouty subject gets bronchitis or irritable bladder, and you find you make no progress in your treatment until suddenly the gout appears in the great toe or instep, when, all at once, the internal affection gives way. Nothing like this occurs, at least so far as I know, in rheumatic fever.

I will not dwell longer now upon this interesting feature of gout, because I shall have to allude to it again in connexion with the second of the cases which form the text of this lecture; but shall content myself with stating—and you will excuse me if, for the sake of brevity, I do so somewhat dogmatically—that it is when rheumatism or gout is of the low or asthenic kind that this tendency to shift is most marked. And it is also most apt to occur when the patient has become asthenic under antiphlogistic treatment. Of this an interesting, and to me conclusive proof, is afforded by the results of my own practice. Formerly, when I used to bleed largely and purge freely, I found this tendency of gout to shift much more common than of late years, when I have, to a great ex-

tent, abandoned the so-called antiphlogistic treatment as worse than useless in these diseases. I would impress upon you this dogma: an active antiphlogistic treatment creates asthenia—asthenia gives to both rheumatic fever and gout what I may call *the shifting character*, which in both diseases is most perilous, but in the latter especially so; and when you find the tendency to shift already existing in a case, depend upon it that the asthenic condition of the patient is that which demands your earliest attention.

Treatment.—I have referred you to this case of Fountain's as a good example of gout in a common form, and now let me briefly allude to the treatment to which he was subjected in illustration of the plan which you will generally find most serviceable to your patients.

But let me, *in limine*, entreat of you to bear in mind, as an important feature of the clinical history of gout (very necessary to be kept in view in our attempts to form an estimate of the value of this or that plan of treatment), that the great majority of cases such as Fountain's—cases of sthenic gout, in men of good constitution—will get well without any very specific treatment. Suppose you take a hundred cases of gout, if you confine them to bed and keep them warm, and especially keep the affected joint warm, take away their beer, and give them light, wholesome, and nourishing diet, you will find that of these hun-

dred cases perhaps seventy will get well, without any unfavourable symptoms, in from three or four days to a fortnight.

Well, then comes the question, can we accelerate the cure by treatment? I believe that by moderate purgation, and by the use of diaphoretics, by keeping the joints warm, and, if the urine be very acid, by the administration of alkalies, we may expedite convalescence, and undoubtedly relieve pain. The best way to keep the joint warm is by enveloping it in a large quantity of carded cotton or cotton wool, and covering the whole with oiled silk: you thus place the joint in a kind of local vapour-bath, which causes free sweating of the skin around it, and likewise promotes a general diaphoresis. It has this advantage over a general vapour-bath,—that you can more exactly limit its influence, and that it does not tend, unless carried too far and kept on too long, to weaken the patient. A general vapour-bath, although highly plausible in theory, is practically very objectionable, because, whilst you may hit off with tolerable exactness the precise amount of sweating desirable in one case, you will overshoot the mark in half a dozen.

A great advantage of this local treatment is, that in nine cases out of ten it relieves pain, and that pretty quickly. As soon as the joint has become thoroughly warm, and the sweating process is fairly established, relief is generally experienced.

I have satisfied myself by repeated trials that counter-irritation over the affected joint is of decided utility in many cases, both in relieving pain and removing the effusions or thickenings which remain in gouty joints. This may be effected by the local application of mustard, or turpentine, or naphtha; but what I prefer, and use most frequently, is a *small* blister. It is important that the blister should be small,—large ones increase the articular irritation; they may vary in size, according to the size of the joint, from that of a sixpence to that of a half-crown, or, at the very largest, a crown-piece. You will often find it decidedly beneficial to apply mustard or turpentine for twenty minutes or half an hour before the blister is put on, the effects of which are thereby accelerated, and the quantity of serous discharge increased. You need not be deterred from pursuing this plan of treatment, even in the earliest stages, when the joint is most red, and looks most inflamed and excited; it succeeds admirably, provided always that you take care not to irritate or vesicate too large a surface.

The application of leeches to a gouty joint is, in my opinion, much to be deprecated. It is difficult to say why this should be so, but I have so often seen joints weakened by this practice, that I have no hesitation in condemning it. There is no doubt that if you apply leeches to gouty joints you will relieve the pain pretty quickly, but you will leave

a state of permanent weakness, from which the patient will be a long time in recovering. It will be for you to decide which is preferable,—to try and relieve pain quickly by a method which is at best uncertain, but which is pretty sure to leave a weakened joint; or to adopt a method less rapid as regards the relief of pain, but more sure as to its ultimate effects. I confess I prefer the slower and surer method. As regards the blistering plan, I can very confidently state that I have never seen any bad effects from it when the blisters have been confined within the limits of size which I have mentioned.

Many will say to you, you must use colchicum, and they will think you very unorthodox if you attempt the cure of either rheumatism or gout, but especially the latter, without the use of this drug. They hold, or act as if they held, that colchicum exerts a special influence over the morbid matter or other cause which gives rise to an attack of gout,—that it kills it, as it were, and bears the same relation to the gouty poison that quinine does to the paludal poison, or iodide of potassium to that of secondary syphilis. That colchicum bears some curious relation to gout, I am quite prepared to admit, but I believe that this relation is one sometimes for good, and sometimes for evil; and you will, perhaps be startled when I tell you that it appears to me that in the majority of cases this relation is of

the latter kind. I have no doubt that in sthenic cases in young subjects colchicum relieves pain, and hastens the removal of the paroxysm: but, at the same time, experience leads me to subscribe to a belief very popular among gouty patients, that if it shortens the duration of the attack, it likewise shortens the interval between the attacks. There is great danger of patients getting into the habit of taking colchicum in large and even in increasing doses, much as they would opium. Colchicum is one of those drugs of which the system gets very tolerant; and if, in a first attack, the patient take ten minims, in the second he will require twenty, in the third more, and so on,—just as an opium-eater requires continually-increasing doses of his favourite drug. Indeed, you find confirmed colchicum-drinkers just as you find confirmed opium-eaters. I once attended a lady of high rank who had gradually accustomed herself to doses of the wine of colchicum, which were measured, not by tens or twenties, but by hundreds of minims; and yet, such was the little influence of these large doses upon the essence of the disease, that her attacks became more and more frequent, her joints were horribly crippled, and her nervous system was fearfully shattered. I endeavoured to persuade her to leave off the colchicum, but without success; and she ultimately died in a state of extreme prostration,—due, as I believe, mainly to the inveterate addiction to this drug.*

* See also Case XLIII., Lect XII., p. 339.

For these reasons I object to the too prevalent routine practice of giving colchicum in gout, and prefer trying to cure the paroxysm without it. Those of you who constantly follow my practice know that I very rarely have recourse to it, and that my patients get well as quickly, and, I believe, more certainly, than if they had taken that drug. When I use it, it is generally in ten or fifteen-minim doses of the wine of the root, or in single grain doses of the acetic extract.

Fountain took small doses of colchicum wine immediately on his admission, but without any very encouraging result. The gout, certainly, became much less severe in his feet; but, while he was still taking the colchicum, he was attacked with gout in his right knee. This not appearing to yield, the colchicum was discontinued, alkalies were administered, a blister was applied, and an occasional aperient was given.

The remedy which seemed to act with the most marked benefit was the blistering. On the 17th, the great toe, and dorsum of the foot on both sides, were extremely painful and swollen; and on the 18th, after the blisters had been applied, the pain had greatly subsided, and the swelling was much diminished; on the 22nd he was so much better that he was able to walk along the wards; on the 26th, however, while he was still taking colchicum, the right knee became painful and swollen.

Now we observed here a point which is worth your attention in reference to prognosis—namely, that the tongue remained more or less coated so long as the general gouty condition had not materially abated. The feet had recovered, but the knee became affected, and the tongue continued foul throughout; and when the attack in the knee came on, the tongue acquired an accession of fur, nor did it become clean for several days afterwards; and we found that, as the tongue became clean, the convalescence advanced *pari passú*.

Thus, if you watch the tongue, you will find in it the best index to the increase or diminution of the constitutional disturbance which accompanies the gouty paroxysm. If it remain foul, your patient is not safe, even although the local symptoms may have wholly or in part subsided; if it continue clean, you may conclude that matters are going right.

Under a treatment by alkalies, occasional blisters, and aperients, this patient got quite well, and left the hospital on the 18th of December, one month from the date of his admission.

The next case to which I propose to call your attention is remarkable for the enormous deposits of urate of soda about the joints, and other interesting symptoms; but as I have already occupied a good deal of time with one case, I must make the other the subject of my next lecture.

LECTURE XVI.

On Asthenic Gout.

THE second case of gout, gentlemen, to which I briefly referred in my last lecture, affords many points which deserve your most attentive consideration. It is not only an excellent example of a form of disease in which the generation and deposition of urate or lithate of soda take place in enormous quantities, but it also affords a good illustration of the symptoms which indicate that the gouty poison is attacking the stomach and the bronchial tubes. I do not know that I could select a better example of the asthenic and the erratic form of gout.

CASE LV.—The patient to whom I allude is William Pyne, who has been for some weeks in Sutherland ward (vol. xxxii., 1850, p. 31). His age is 43, and he is a carter by trade. It does not appear that he has been at all an intemperate man in his habits, but he has been accustomed to take his daily allowance of beer, and it is not improbable that at times he indulged freely in that liquid to help him on in the labours of the day.

This man's first attack of gout occurred so long ago as nine years, when he was only 34 years of age; and it was followed by a second six months

afterwards. Since that time he has not been free from an attack of gout for three months together. These attacks were, however, slight, and did not cause him to lie up for more than two or three days each time: possibly they were treated by colchicum; the gouty paroxysm was perhaps "knocked down" (as it is often said to be) by that medicine; however, this knocking down did not prevent the frequent recurrence of the attacks, nor did it alter a character of the disease which was conspicuous in this patient from the first, namely, a tendency to shift from one joint to another. But during the last five years the paroxysms have been much longer in duration than they previously were, generally lasting as long as five or six weeks.

It was in one of these long attacks, four years ago, that a symptom showed itself which is characteristic of the peculiar form of gout to which this man is subject. Small deposits were observed growing beneath the skin of the ear, and about the knuckles of both hands. These deposits consisted of urate of soda. They have increased in size and number with each subsequent paroxysm.

In November, 1848, he was a patient in the hospital for another attack. On this occasion a very large collection of the chalky deposit formed on the back of the right hand; it was opened, and a great quantity of a white semi-liquid matter escaped, looking like wet plaster of Paris. This,

on examination, proved to be urate of soda. In this attack other symptoms occurred of great interest, and marking this particular form of gout. He had, for instance, a severe attack of bronchitis, upon which the ordinary remedies seemed to exercise little or no influence, and which did not yield until after gout appeared in his feet. Soon after this he suffered from excruciating pain in the stomach and from vomiting, with great flatulent distension of the stomach and bowels.

All these symptoms, however, yielded to the treatment pursued, and he left the hospital much improved in health, after a sojourn in it of some seven weeks, and continued free from any serious return of the gout until the 23rd of September of this year (1850), when he was admitted for an attack of the disease affecting the little finger of the right hand, and the elbow of the same side. These parts were very red and much swollen, and extremely painful. The development of gout in them was preceded by a fit of shivering, and by severe pain in the stomach and vomiting. His tongue was coated with a thick fur, and his pulse was 108.

The gouty inflammation spread quickly to the other fingers and to the whole hand, and an abscess formed in the little finger, from which, when opened, a large quantity of pus mixed with urate of soda escaped. The sickness increased,

so that he vomited everything almost as soon as it was taken.

Under the use of small quantities of stimulants, and ammonia in effervescence, the ammonia being slightly in excess, these symptoms subsided; the fingers ulcerated and burst, and urate of soda was discharged in considerable abundance.

On the 30th of October, however, the sickness returned; the left hand was attacked by gout, the right continuing much inflamed and discharging, and a new symptom showed itself in some difficulty of breathing, with a very general rhoncus over the whole chest. Soon afterwards both feet and knees became affected with gout, and copious effusions were formed in the knee-joints.

On the 3rd of November, the hands and arms presented a most formidable appearance, of which I thought it well to preserve a record in the drawing which I now show you. Both hands were enlarged to nearly double their natural size, and the skin over them was red and tense; a deposit of urate of soda had formed over every joint, and in several places there were small collections discharging freely both pus and lithate of soda. The swelling extended over the forearms, and a considerable collection of matter formed near the inner condyle of the right arm.

It was observed at this time that some albumen existed in the urine, which varied in quantity, being greatest when the constitutional disturbance

was most intense, and decreasing with the diminution of the febrile excitement.

For several days abscess after abscess formed, each containing pus and urate of soda. These were opened in succession; and while this was going on, it was found necessary to administer stimulants very freely, which, by being given in small doses at short, but regular, intervals, he was enabled to bear, and the irritability of his stomach was thereby greatly relieved.

After all the abscesses had been freely opened, and the urate of soda discharged in large quantities, the fingers became much reduced in size, and the general constitutional disturbance quickly subsided. The catarrhal sounds disappeared, the vomiting ceased, the appetite returned, and he was enabled to eat a little solid food. The joints all improved, and he soon began to walk about the ward. The condition of his fingers became much better than before his admission, for the great masses of urate of soda were removed; and although the fingers were stiff, they could be placed close together, and were much more serviceable than previously.

The first point that we may notice in this case is the accumulations of urate of soda. These accumulations, you observe, took place about the small joints of the upper extremities; and this is almost always the case. Although the

lower extremities do not wholly escape, still the great accumulation is generally in the upper ones, and the quantity found in the lower ones is usually comparatively small.

The deposit takes place in greatest abundance in the subcutaneous tissue. I show you here a drawing of a large collection of it under the skin of the elbow. It will accumulate in the areolæ of the areolar tissue; in some instances it forms a hard dense mass intersected by the bands of fibres of that tissue, but in others these bands of fibres seem to be absorbed, and a cavity is formed filled wholly with this material, from which it may be easily dislodged when the skin is freely opened. But at the same time it is often found in joints, seeming to smear the articular surfaces of the bones, and making them rough, so that, as I have often pointed out to you in Pyne's and other cases, they grate against each other; and it will make its way into the interstices of the fibres of ligaments and tendons, and stiffen them. A very common place for these deposits is in the ear, beneath the skin covering the cartilages; and it sometimes occurs over the cartilages of the alæ nasi. Sometimes the water with which the deposit is mingled, and which gives it its soft pasty character, becomes absorbed, and a dry chalk-stone is formed which will leave a mark on a black board. Here is one of these concretions as large as a marble, removed from one of Pyne's knuckles.

I would ask you to bear in mind another curious point connected with these deposits: it is this, that they occur *early* in the disease. This man was under forty when they came on, and he had not been more than five years the subject of fits of gout before these accumulations had taken place to a considerable extent. This fact, which I have observed in several other cases, seems to me to indicate that the disease in which such accumulations occur is a special clinical form of gout. You will see many instances of patients having had paroxysm after paroxysm of gout for a long series of years without anything like such an accumulation: joints may be damaged, cartilages altered, ligaments and tendons stiffened, but the areolar tissue will be free from any collections of urate of soda. But in such cases as that of Pyne each fresh paroxysm is accompanied with a new deposit, or a greater or less addition to those already existing. Again, in the more ordinary forms of gout, it is the lower extremities which suffer most, and to which the greatest mischief is done; but in this the upper extremities are the seat of the most abundant deposits, while the lower extremities by no means escape unscathed.

I do not suppose that the inflammation, which in this case affected the upper extremities, reaching above the elbow, was purely of the gouty character; because we found that it ended in the

formation of numerous and considerable collections of pus. The tendency of the gouty inflammation is not to form pus, but (and especially in this particular form of it) rather to generate and eliminate urate of soda. A case of erysipelas occurred in the ward shortly after this patient was admitted, and I fear he imbibed some of the erysipelatous poison. The tendency of the erysipelatous inflammation is, as you well know, in a remarkable degree, to generate pus. Thus we had in the same subject two orders of inflammation, each tending to generate a different product,—the one the urate of soda, the other pus; and accordingly the collections which formed at various points were found, on being opened, to contain both these products mixed together. In the ordinary attacks of this form of gout the newly-deposited urate of soda is mixed with a thin, whey-like fluid, which contains some pus-cells, and which may therefore be regarded as sero-purulent.

We had a good opportunity in this case of witnessing the clinical phenomena which accompany gout when it attacks the stomach or bronchial tubes, or when it irritates the kidneys.

The symptoms, which indicated that the stomach was attacked, were the severe and incessant vomiting, the pain in the region of the stomach, which at times was agonizing, and the tympanitic distension of the organ. When the stomach is affected with gout, its mucous membrane appears

to become highly irritable, and it secretes gas with great rapidity, which distends the organ. It is this great inflation of the stomach which probably (at least in great part) causes the violent pain which patients suffer under the attack; for when they are able to expel wind in considerable quantity the pain becomes much less, or entirely disappears. But the ability to expel wind by the efforts of the muscular coat of the stomach is impaired, the power of that coat being weakened partly by the distension and partly by the influence of the gouty poison; and this very weakening of the muscular coat allows the organ to become unduly distended. Vomiting, or the expulsion of matters from the stomach, must in such cases as these be effected mainly, if not wholly, by the abdominal muscles.

There was here no metastasis, but the stomach was attacked simultaneously with the other parts. But you may often see the selfsame symptoms, as regards the stomach, follow the sudden suppression of external gout, or precede the development of it in the foot or some other part.

It is difficult to determine what tissue of the stomach is especially the seat of the disease. It seems most probable that the mucous membrane is primarily, and the muscular coat secondarily, affected. Post-mortem examination gives us no aid in determining this question; for the changes which we may fairly suppose are caused by the attack of gout disappear at death, and no trace of

previous disease remains beyond a more or less dilated and flaccid state of the organ; and this dilatation will be the greater as the attacks have been more frequent.

This case showed us likewise how the bronchial tubes become affected in gout. While the hands and forearms, and other external parts, were still suffering, the breathing became more frequent, catarrhal sounds were heard all over the chest, and a troublesome cough came on, accompanied with frothy expectoration. The very same symptoms will often be found to precede the external development of gout, or to follow its recession from some external part, just as in the stomach affection.

Lastly, we observed in this patient evidence of renal irritation, due obviously to the gouty state of the whole system. This was found in the presence of albumen in the urine, which varied in quantity in proportion to the degree of febrile disturbance. But the albumen, although it diminished when the patient became convalescent, did not wholly disappear; whence I infer that the kidneys must have been damaged to some extent,—probably they were in an early stage of that contracted state to which, when occurring in gouty subjects, I have given the name of "the gouty kidney."*

It is worthy of your notice that much the

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* See Lect. XII.

same derangements of internal organs which are liable to occur in gout occur also in erysipelas; and, on the supposition, that this patient had imbibed some of the erysipelatous poison, these derangements may have not improbably been increased by the combined influence of the two poisons, tending to create similar disturbances in the system. Thus the poison of erysipelas, when first imbibed, will occasion severe vomiting,—a symptom often very difficult to deal with, and sometimes causing a fatal issue to the case. So also erysipelas will cause bronchitis, which sometimes precedes, sometimes follows, any external manifestation of the disease upon the skin.

Treatment.—Let me, in conclusion, briefly review the treatment to which this patient was subjected, and at the same time refer to that which seems most applicable to the generality of cases of this form of gout.

Very early in the management of this case we had to deal with the irritable state of the stomach, and the severe pain which was referred to this organ. The remedies on which I relied for the alleviation of these symptoms were opium, the application of free counter-irritation over the epigastric region by mustard and by turpentine, and the exhibition of the sesquicarbonate of ammonia in effervescence, taking care to allow three or four grains of the ammonia to remain in excess at each

dose. The opium was given at night in the shape of morphia in a night draught: it was well borne, and of signal service. I preferred giving it in one dose at night rather than in repeated doses through the day, in order to obtain sleep at the natural time. For two or three nights it was combined with a couple of grains of the acetic extract of colchicum, but this was very soon given up, as it seemed to depress the patient. The effervescing ammonia was exhibited frequently through the day, as often as every two or three hours; and when the erysipelatous state was at its height, I was glad to add to each dose fifteen minims of the chloric ether—a very grateful and valuable stimulant.

At the same time we found it necessary to give brandy in small and frequent doses, and nothing seemed to remain upon the stomach better than this. At first he took two drachms every hour, but it was afterwards found necessary to increase it to half an ounce. You will remember that we obtained the most obvious proof of the necessity for this kind of treatment by diminishing his allowance of brandy one day when he seemed a little improved in strength, from half an ounce per hour down to two drachms. After he had been twenty-four hours on this diminished allowance, we found him very much reduced in strength, his tongue parched and dry, and his pulse quickened; but these symptoms soon dis-

appeared on putting him again on the increased allowance; and this time we gave him two drachms every half hour instead of half an ounce every hour,—a mode of giving stimulants in maladies of a low kind, fever, erysipelas, &c., which you have many opportunities of seeing here attended with the happiest results.

After three days of this treatment the irritability and pain of the stomach had completely yielded; but, on account of the erysipelatous state and the general depression, I judged it advisable to continue it for twelve or fourteen days, and especially when the bronchitis came on. We combated this latter affection likewise by free counter-irritation, with turpentine stupes to the chest, both in front and behind, and afterwards by a blister to the sternum.

On the 21st of November, finding all these more urgent symptoms much improved, I reduced the quantity of brandy down to four ounces in the day, and gave him bark in small quantities (five minims of Battley's liquor cinchonæ), and allowed him a little animal food, still continuing an opiate at night, to relieve an irritable cough. He now improved rapidly, and on the 9th of December was able to get out of bed, and sit up for a considerable portion of the day.

It may seem to you somewhat anomalous that the treatment of a gouty state of stomach should consist in the administration of stimulants like

ammonia and brandy, the intemperate use of which, according to popular belief, tends rather to generate the gouty condition. If, you would argue, there be any state of inflammation of the mucous membrane of the stomach at all like the external inflammation which we have witnessed about the joints of his upper extremities, surely the application of such hot things as ammonia and brandy must do harm. So it would seem reasonable enough, *à priori*, to assume; but in the practice of medicine our reasoning must not be *à priori*,—we must appeal to experience; and that appeal will elicit an unequivocal verdict in favour of this plan of treatment for pure gout in the stomach, and still more if there be, as in Pyne's case there seems to have been, some complication with erysipelas. Nor is this without its analogy; for in many forms of conjunctivitis—and amongst them in that which is associated with a gouty or rheumatic state—you will find great benefit from the application of tincture of opium and of a solution of the nitrate of silver to the eye.

After Pyne had become convalescent, we found his kidneys not secreting sufficiently, and in consequence I ordered him to take an ounce of lemon-juice three times a day. This was followed by an immediate increase in the quantity of urine secreted from a pint to more than three pints in the day; and he continued to pass water at this rate during the rest of his stay in the

hospital,—not, however, free from a small quantity of albumen.

This, indeed, is the chief value of lemon-juice in rheumatic and gouty affections: it increases the quantity of the urine often in a very marked way, and it is agreeable to the taste of the patient, and more easily taken than other diuretics. It tends, therefore, to promote elimination, which is the great end of treatment in these affections; and directing that, as it does, through the kidneys, it does not pull down or depress the patient in any injurious way. But I do not hold that it possesses any specific virtue over these maladies; nor do I consider it prudent to rely on it alone in the acute forms: still I think the profession is much indebted to my friend, Dr. Owen Rees, for having called attention to the use of this remedy in these diseases, and for having sanctioned by his high reputation its employment in opposition to prejudices which we all naturally felt against giving so much vegetable acid in maladies of which a prominent feature was the highly acid state of certain secretions.

I had been in the habit of using lemon-juice as a diuretic in dropsies of all kinds long before Dr. Rees introduced it into notice as an anti-rheumatic remedy, and in some instances with very marked benefit. I shall not readily forget one case of universal cardiac dropsy in which the use of this remedy, after a trial of most of the other diuretics, cleared off the dropsy in a few days.

You saw that we opened freely the various collections of pus immediately they were formed, and also the collections of urate of soda. There can be no second opinion as to the propriety of evacuating by mechanical means collections of pus; but as to the accumulations of urate of soda it may be a question whether it is safe or worth while to interfere with them. Now with reference to this point, you must bear this in mind,—that these collections may be small or large; the small ones generally form in positions where there is a mechanical impediment to the accumulation of the inorganic material to any very great extent; the large ones collect where the skin is more or less loosely connected with the subjacent parts. The large ones, when allowed to increase beyond a certain point, create inflammation and ulceration of the skin, and burst. In many of these cases you may, I think, save your patient a tedious process of this kind, by freely incising the skin, evacuating the collection, and using precautions afterwards—such as poulticing, fomenting—to guard against inflammation following the incision.

Very often you will succeed in completely evacuating these collections by this treatment without any untoward consequence; but sometimes the incision is followed by a good deal of troublesome inflammation, and even by an attack of gout. These consequences are, however, more

apt to ensue where the urate of soda has not been completely removed, as when the accumulation is formed in the areolæ of the areolar tissue, and not in a single cavity. Hence it is more prudent not to interfere with the deposit unless you can be satisfied that it is contained in a separate cavity, or in two or three large cavities, which communicate freely with each other.

By the evacuation of several accumulations in this way, Pyne's hands are now in a very much better state than before his admission, and he can use them much more freely; and it will depend on the degree of improvement which his constitution will experience under a further treatment, chiefly by regimen, whether fresh deposits will take place or not.

THE END.

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